THE IMPACT OF MEDICAID ON CHILDREN'S HEALTH SERVICE USE: A TEN-YEAR RETROSPECTIVE ANALYSIS

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by
Norma I. Gavin
Research Triangle Institute
and
Deo S. Bencio
Mathematica Policy Research, Inc.

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Feather Davis, Ph.D.
Office of Research and Demonstrations
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7500 Security Boulevard
Baltimore, MD 21244-1850

Submitted by:

Norma I. Gavin, Ph.D.
Research Triangle Institute
P.O. Box 12194
3040 Cornwallis Road
Research Triangle Park, NC 27709

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EXECUTIVE SUMMARY

From 1984 to 1990, major changes occurred in Medicaid coverage of children. Eligibility criteria were expanded and became more uniform across the States, covered services were broadened and enhanced, and barriers to provider participation were removed. This report looks at health service use among Medicaid children and other groups of children in the United States from 1982 to 1991 to determine whether these changes in the Medicaid program achieved significant improvements in health care access for children from low-income families and whether the changes provided Medicaid children access to care equal to that observed among children in higher income families.

Our analysis investigates three years of data from the National Health Interview Surveys (NHIS) during this ten-year period - 1982, 1988, and 1991. These years provide snapshots of the health status and health service use of children before, during, and shortly after the program changes. Children are separated into five health insurance and income groups for analysis: (1) children with Medicaid coverage and no other insurance coverage; (2) children with Medicaid and other insurance coverage; (3) uninsured children in families with incomes below 200 percent of the Federal poverty level (FPL); (4) children with other health insurance in families with incomes below 200 percent of the FPL; and (5) children in families with incomes at or above 200 percent of the FPL.

We first investigate differences in the distributions of these children over various demographic, geographic, and family characteristics believed to impact health status and health care-seeking behavior. We also investigate changes in these characteristics over time. We then present descriptive analyses of various health status and health service use indicators on the NHIS files. We investigate both acute and chronic health conditions and illness-related and preventive health care services. Finally, we present multivariate analyses of selected health service use measures to show the relative impact of Medicaid coverage on children's health service use, holding health status and the demographic, geographic, and family characteristics constant. We also investigate differences in the impact of Medicaid for selected program

education increased among children in all health insurance and income groups, with the largest increase among Medicaid mothers.

Differences in Health Status

We found Medicaid children had more activity limitations due to chronic conditions and were perceived by their caretakers to be in poorer relative health compared to other children. Furthermore, while Medicaid children had a higher incidence of acute conditions than other low-income children, they were not more likely than children in moderate-to-high-income families to have a higher incidence of acute conditions or to see a physician for these conditions.

In addition to the differences in health status among children in the different health insurance and income groups, we found changes in children's health status within group over the study period. All of the indicators investigated suggest that children, and in particular teenagers, are becoming less healthy over time. However, at least part of this increase may be due to other factors, such as improved diagnosis and reporting of activity limiting chronic conditions; a trend toward deinstitutionalization that increases the number of disabled children counted by the NHIS; improved medical technologies that allow chronically ill children to survive longer; and reductions in mortality rates for low-birthweight newborns.

Differences in Health Service Use

In the descriptive analysis, we found Medicaid children to have higher utilization levels for illness-related care compared to other low-income children. In addition, while Medicaid children had higher hospital use than children in moderate-to-high-income families, they had fewer outpatient contacts and received care in different settings.

The discrepancy in access to health care between Medicaid children and children in moderate-to-high-income families is accentuated by the much poorer relative performance of Medicaid children on the preventive care measures. We investigated both dental care use among two-to-six-year olds and immunization completion rates among preschool-aged children. The

Summary and Conclusion

In summary, we found that Medicaid did improve access to at least illness-related care among children in low-income families, and that in 1991, higher fees increased physician contacts among Medicaid children. However, we did not find improved access to preventive care from Medicaid coverage. In addition, there were significant other barriers to care that prevented Medicaid children from utilizing either illness-related or preventive care services at levels significantly higher than other low-income children and/or at levels equal to children in higher income families. The consistent negative impacts found for African-American children and children whose mothers had only a high school education and the disproportionately large percentage of Medicaid eligible children with these characteristics are particularly notable. These results suggest that significant outreach and education programs are needed to achieve equal access to care for these children.

A. INTRODUCTION AND BACKGROUND

In this analysis, we compare the health status and health service use of Medicaid children to those of insured and uninsured children in low-income families and of children in families with moderate to high incomes. These comparisons address two important policy questions. The first comparison shows how low-income children who would be newly eligible for Medicaid or a reform plan under expansion legislation differ in their health care needs and health care-seeking behavior from children enrolled in Medicaid. This information is critical in planning and budgeting such legislation. The second comparison shows how Medicaid children's health status and health care-seeking behavior differ from that experienced by children with little or no financial barriers to care. This information is necessary to determine whether all children in the United States have equal access to care and, if not, how to better target public health programs to achieve such a goal.

Our analysis covers three years in a ten-year period - 1982, 1988, and 1991. During this time, major expansions took place in Medicaid eligibility and service coverage. Historically, Medicaid covered only children meeting the categorical and financial requirements of the Aid to Families with Dependent Children (AFDC) program and the Supplemental Security Income (SSI) program for the blind and disabled, and special groups of children, such as those in foster care. States could optionally cover children who met the categorical requirements for these programs and a somewhat higher "medically needy" income limit or who "spent down" to this limit by incurring large enough medical bills. These restrictions left a large number of children living in poverty without Medicaid or other health insurance coverage. Moreover, because categorical eligibility for Medicaid was linked to such criteria as parent's marital and employment status, which could vary over time, many children were eligible for limited periods of time.

In the late 1970s and early 1980s, the proportion of poor children covered by Medicaid was eroded even further by the failure of States to increase the financial ceilings of their AFDC programs and the Federal government's enactment of the Omnibus Budget Reconciliation Act of 1981 that eliminated close to half a million working families from AFDC roles and Medicaid eligibility (Oberg, 1990). At the same time, the proportion of low-income children with

problem or condition that requires an assessment, further diagnosis, or treatment. The law also required States to provide all medically necessary services eligible for Federal financial assistance to children whose periodic or interperiodic screens reveal problems, even if the services are not otherwise covered under the State's Medicaid plan. In addition, OBRA-89 codified regulations to require that screening, vision, hearing and dental services be provided at intervals that meet "reasonable standards of medical and dental practice"; mandated States to develop distinct periodicity schedules for screening, vision, hearing and dental screens; required States to screen all children ages one to five years and others at risk for lead poisoning; and required the provision of health education and anticipatory guidance in screening visits.

OBRA-89 also addressed incentives for provider participation in Medicaid. While States were generally required to set reimbursement rates for Medicaid-covered services at levels that ensure comparable service availability to that of the general population within the same geographic area, OBRA-89 codified this provision for obstetrical and pediatric services. It also directed States to submit fee schedules and other data for obstetrical and pediatric services to ensure compliance with the law. Furthermore, OBRA-89 allowed qualified practitioners who provide less than the full set of screening, diagnosis, and treatment services to participate in the Early, Periodic Screening, Diagnosis, and Treatment (EPSDT) program, the children's component of the Medicaid program. These amendments were intended to encourage a larger number of pediatricians and more specialists, such as developmental psychologists, to participate in EPSDT.

In this report, we investigate children's health status and health service use before, during, and shortly after these expansions. Besides health status and health service use, we investigate differences in the distributions of the child population groups over various demographic, geographic, and family characteristics and changes in these distributions over time. We also measure the relative impact of Medicaid coverage on children's health service use, holding health status and these various other characteristics constant.

collected in a child health supplement (CHS) that was administered to one child aged 0-17 years in every surveyed household with children under 18 years of age. Respondents were asked *only* if the child was ever covered by Medicaid in the previous 12 months and whether s/he was covered by *any* health insurance plan at the time of the survey.[2] In the 1991 NHIS, health insurance information was collected in a family resources supplement. Respondents were asked *only* whether individuals were covered by Medicaid or other insurance during the survey month. Thus, while we can identify children enrolled in Medicaid sometime in the previous 12 months but not during the survey month in both the 1982 and 1988 surveys, we cannot in the 1991 NHIS. As a result, differences in the distributions over insurance coverage categories between the 1991 and earlier surveys may be due to differences in how the questions were asked rather than policy or system changes over time.

We further stratified uninsured and non-Medicaid insured children by income. In particular, we separated out children living in low-income families from other children, where low-income is defined as incomes less than two times the FPL.[3] However, because the 1982 and 1988 NHIS collected income information in ranges rather than in continuous form, we had to identify the range at which the lower bound came closest to twice the FPL for each family size category. Any child with a family income below this level was designated as "low-income."[4] The 1991 NHIS collected income in continuous form, and therefore, we were better able to select children in families with incomes below 200 percent of the FPL. Finally, because 93 to 95 percent of children in families with incomes 200 percent or more of the FPL were covered by health insurance, we combined the two higher income groups.

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[2] All three surveys also asked whether the family had received cash assistance from the AFDC program, and the 1982 and 1991 NHIS also asked whether the child had received cash assistance from the SSI program. These data were also used to flag Medicaid children.

[3] Two times the FPL was chosen as the cut-off for low-income families because of its use by other researchers (e.g., Short and Lefkowitz, 1992) and because of its proximity to the 185 percent cut-off of the most recent optional Medicaid expansion groups.

[4] The FPL and income cut-offs for each family size category are shown in Appendix Table A-1.

supplement - that is, one child aged 0-17 years per sampled household. A child health supplement was also administered to one child aged 0-17 years per sampled household in the 1991 NHIS. For these years, we used these smaller samples in both the descriptive and multivariate analyses. The National Center for Health Statistics (NCHS) adjusted the sample weights for children on these files to account for the selection of one child per surveyed household. We made no additional adjustments to account for the children with missing health insurance or income information in any of the analysis years.

2. Selection of Children in the 1982 NHIS for the Multivariate Analyses

For consistency with the 1988 and 1991 data and because substantial positive correlations in the error terms among family members can result in inefficient estimates of the coefficients and inconsistent estimates of the standard errors, we randomly selected a single child from each 1982 NHIS household with children for the multivariate analyses. (We used the full sample of children under 18 years of age in our descriptive analyses of the 1982 NHIS data.)

We adjusted the sample weights of the selected children to reflect the probability of selection by multiplying the child's core weight by the number of children under 18 years of age in the household. For example, in a household of three children, the sampled child had a one in three probability of selection. Therefore, we multiplied the child's weight by three. In addition, because a sample selected in this manner will be younger on average than if all children in the family were included, we also performed a post-stratification adjustment of the sample weights by age, race, and gender to make the distribution of sampled children match that of all children in the 1982 NHIS core sample. Our post-stratification cells matched those used by NCHS in adjusting the weights for the 1988 and 1991 NHIS-CHS samples.[5]

Appendix Table A-3 shows the distribution over various demographic and socioeconomic characteristics of the weighted subsample of children selected for the multivariate analyses. By comparing, these distributions to those in Table 1 of Section C, we see that despite the post-

[5] See USDHHS (1991), Appendix I, pp. 43-45.

characteristics of the children's actual mothers for the vast majority of children in the 1982 and 1991 NHIS files. Applying the procedures to the files for the other two years, we found mothers for all but 114 (or 0.4 percent) of the 28,283 children reported as living with their mothers in the 1982 core sample and all but 116 (or 0.7 percent) of the 16,265 children reported as living with their mothers in the 1991 NHIS-CHS sample.

4. Provider Supply Information and Medicaid Program Data

Finally, in determining the impact of the Medicaid program on children's health service use, we controlled for different state-level Medicaid program characteristics and medical service supply factors that NCHS merged to the NHIS files for us. These additional variables are:[7]

Medicaid Program Characteristics

- the ratio of the State AFDC payment standard for a family of size two to the FPL for a family of size two; and
- the ratio of State Medicaid fees for an intermediate office visit for an established patient to the comparable Medicare allowed charge in the Medicare Prevailing Charge Area.[8]

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[7] We additionally had a dichotomous variable representing whether or not the State's Medicaid program covers the medically needy and the percentage of total births that were low birthweight merged to the file. The latter variable was added as a potential indicator of inadequate access to care and/or inadequate outreach among an at-risk population. We did not find these variables to be significant in the regressions and therefore we dropped them from the analyses.

[8] The State Medicaid fees were obtained from surveys conducted by The Urban Institute. Because these data only go back to 1984, we had to use the 1984 fees as a proxy for the 1982 fees. Unfortunately, our variable is based on a single procedure (an intermediate office visit for an established patient), and researchers have noted that a State's payment on any single procedure is not necessarily representative of the State's overall Medicaid reimbursement generosity (Wade, 1992). Furthermore, the denominator against which the Medicaid variable is measured is the Medicare prevailing charge for the procedure, whereas the charge for children's visits in the private market is the theoretically correct measure to use. However, because private fees for the entire United States are not available for all three of our analysis years, we were not able to use such a measure and therefore used the best measure available.

conducted similar descriptive analyses of various health status and health service use indicators. Health status indicators investigated include the number of acute conditions incurred, the prevalence of activity limitations from chronic conditions, and perceived overall health. The health service use measures investigated include physician contacts and hospitalizations. These measures were collected in all three study years. In addition, the 1988 NHIS-CHS gathered information on children's usual source of routine and illness-related care and the 1991 NHIS-CHS gathered data on dental visits made in the previous 12 months by children aged two to six years and immunizations received since birth among children under six years of age. We compared levels of these measures among children in the different health insurance and income groups as well.

Then, to determine the relative impact of various characteristics of children, their family, and the geographic area in which they reside on children's health service use, as well as the impact of Medicaid coverage holding these characteristics constant, we estimated multivariate models of selected health service use measures. For both physician contacts and dental visits, we used a two-part model of demand as described below. In the physician contact analysis, we pooled the observations from the three data years and added variables reflecting the generosity of the eligibility criteria and of provider reimbursement levels. We allowed the coefficients for the Medicaid program variables to vary in the three years so that we could test for differential program impacts over time. For dental visits and immunization status, we had data for 1991 only. We modeled immunization status with a single logistic regression of the probability that the child was up-to-date in his/her basic childhood immunization series.

Two-part model. The two-part model separates out the decision to seek care from the decision on the amount of care to receive, with separate estimation of the probability of any contacts/visits and the number of contacts/visits given that at least one contact/visit was made

C. COMPARISON OF CHILD POPULATION CHARACTERISTICS

Demographic, geographic, and family characteristics are important determinants of health status and health service use (Egbuonu and Starfield, 1982; Starfield, 1982; Starfield and Budetti, 1985; Rosenbach, 1989; Short and Lefkowitz, 1992). The extent to which these characteristics vary among the different child populations and the extent to which they change over time may confound our analyses of the impact of Medicaid coverage on children's health service use. Furthermore, it is important to know how low-income children who are becoming eligible under recent Medicaid eligibility expansions or who may become eligible under health care reform differ in these characteristics and thus in their health care-seeking behavior. These differences will have significant implications on the potential success of the expansions and on projected program costs. Therefore, we first compare the demographic, geographic, and family characteristics of the population of children on the survey files in the different health insurance and income groups of concern.

1. Health Insurance and Income

The distributions over the subgroups of children in the 1982, 1988, and 1991 NHIS surveys are shown in Table 1. Among the children with known health insurance and income information in the 1982 NHIS file, 11.7 percent were covered by Medicaid sometime during the previous 12 months. The majority of these children (89 percent) were covered by Medicaid alone. Compared to children with both Medicaid and other health insurance, a larger percentage of children with Medicaid coverage alone lived in families with incomes below the FPL and were AFDC recipients.

Changes from 1982 to 1988. There was a marked increase in the number of children covered by Medicaid from 1982 to 1988. In the 1988 NHIS-CHS, 16 percent of children with known health insurance and income information were covered by Medicaid sometime during the previous 12 months. This growth is attributable to eligibility expansions that occurred between 1984 and 1988. Besides the greater total number of children covered by Medicaid, the expansions brought into the program a greater proportion of children with working parents who

TABLE 1

SELECTED DEMOGRAPHIC, GEOGRAPHIC, AND FAMILY CHARACTERISTICS OF CHILDREN BY HEALTH INSURANCE AND INCOME GROUP, 1982, 1988 and 1991 NHIS

	1982				
	Medicaid Alone	Medicaid and Other Insurance	Low-Income Uninsured	Low-Income and Other Insurance	Moderate to High Income
Sample Size					
Unweighted	2,870	349	3,281	7,852	13,059
Weighted (1000s)	6,014	772	6,910	16,499	27,708
Percent[1]	10.4	1.3	11.9	28.5	47.9
Financial Status*					
At or above poverty	10.5	30.8	63.0	91.1	99.9
Below poverty, non-AFDC	13.5	10.6	36.8	8.8	0.0
AFDC recipient	71.5	54.5	0.0	0.0	0.0
Unknown	4.5	4.2	0.2	0.1	0.1
Age*					
≤ 12 months	7.8	6.3	7.3	5.8	5.9
1 - 2 years	14.0	12.8	12.7	10.2	10.7
3 - 6 years	23.8	24.1	21.4	22.1	19.7
7 - 12 years	30.5	30.5	31.8	34.6	32.1
13 - 17 years	23.8	26.3	26.9	27.3	31.6
Gender*					
Male	50.1	49.8	51.2	51.7	51.0
Female	49.9	50.2	48.8	48.3	49.0
Race/Ethnicity*					
White	36.8	45.0	56.8	70.8	84.5
African-American	40.6	44.4	18.4	15.3	6.1
Hispanic	18.4	6.9	21.2	11.3	6.9
Other	4.2	3.7	3.6	2.5	2.6
Region*					
Northeast	28.7	18.0	13.0	20.5	21.3
Midwest	25.1	34.1	18.5	27.1	28.1
South	27.1	25.0	44.0	35.3	30.7
West	19.1	22.9	24.5	17.1	19.9

*The p-value for the chi-squared test for equality in the distribution among the different child populations is <0.005.

TABLE 1

SELECTED DEMOGRAPHIC, GEOGRAPHIC, AND FAMILY CHARACTERISTICS OF CHILDREN BY HEALTH INSURANCE AND INCOME GROUP, 1982, 1988 AND 1991 NHIS (Continued)

	1988				
	Medicaid Alone	Medicaid and Other Insurance	Low-Income Uninsured	Low-Income and Other Insurance	Moderate to High Income
Sample Size					
Unweighted	1,716	600	1,303	2,960	8,487
Weighted (1000s)	6,731	2,243	5,245	13,012	29,001
Percent[1]	12.0	4.0	9.4	23.2	51.5
Financial Status*					
At or above poverty	6.8	19.8	55.3	83.7	99.3
Below poverty, non-AFDC	10.7	11.3	44.2	15.7	0.0
AFDC recipient	78.4	66.1	0.0	0.0	0.0
Unknown	4.2	2.8	0.5	0.6	0.7
Age*					
≤ 12 months	10.3	9.9	7.0	5.4	5.8
1 - 2 years	13.4	17.1	14.2	10.2	10.9
3 - 6 years	24.9	24.6	20.9	25.4	21.9
7 - 12 years	30.0	26.9	32.7	34.7	32.2
13 - 17 years	21.4	21.5	25.3	24.2	29.3
Gender					
Male	51.6	50.0	50.5	50.8	51.4
Female	48.4	50.0	49.5	49.2	48.6
Race/Ethnicity*					
White	35.8	46.3	50.4	69.7	80.8
African-American	39.3	28.2	18.0	16.2	7.1
Hispanic	20.6	19.1	26.8	11.6	9.1
Other	4.3	6.4	4.8	2.5	3.0
Region*					
Northeast	17.9	21.5	9.7	16.1	20.3
Midwest	28.0	32.7	14.2	27.8	27.2
South	33.0	20.1	51.0	38.2	30.6
West	21.2	25.7	25.0	17.9	21.9

*The p-value for the chi-squared test for equality in the distribution among the different child populations is <0.005.

TABLE 1

SELECTED DEMOGRAPHIC, GEOGRAPHIC, AND FAMILY CHARACTERISTICS OF CHILDREN BY HEALTH INSURANCE AND INCOME GROUP, 1982, 1988 and 1991 NHIS (CONTINUED)

	1991				
	Medicaid Alone	Medicaid and Other Insurance	Low-Income Uninsured	Low-Income and Other Insurance	Moderate to High Income
Sample Size					
Unweighted	2,230	180	1,568	3,205	7,815
Weighted (1000s)	9,286	815	6,433	13,797	27,434
Percent[1]	16.1	1.4	11.1	23.9	47.5
Financial Status*					
At or above poverty	11.1	29.6	53.3	84.4	100.0
Below poverty, non-AFDC	22.0	18.1	46.0	15.5	0.0
AFDC recipient	59.8	44.1	0.0	0.0	0.0
Unknown	7.1	8.3	0.7	0.2	0.0
Age*					
≤ 12 months	12.1	9.4	6.0	5.6	6.1
1 - 2 years	15.0	13.9	10.7	10.8	11.2
3 - 6 years	27.2	22.9	22.2	23.6	22.8
7 - 12 years	26.8	33.9	32.2	34.5	33.6
13 - 17 years	18.8	19.9	28.9	25.6	26.2
Gender*					
Male	49.4	51.8	52.0	50.7	52.0
Female	50.6	48.2	48.0	49.3	48.0
Race/Ethnicity*					
White	35.6	52.7	46.8	69.0	80.9
African-American	35.2	27.7	18.1	14.1	6.8
Hispanic	24.7	14.5	32.0	14.0	8.9
Other	4.5	5.1	3.1	2.9	3.4
Region*					
Northeast	19.4	10.4	13.0	17.5	22.3
Midwest	21.6	26.9	16.2	27.1	25.2
South	33.2	33.3	44.2	35.4	28.7
West	25.9	29.5	26.7	20.0	23.9

*The p-value for the chi-squared test for equality in the distribution among the different child populations is <0.005.

months and the number of children who were enrolled in Medicaid at the time of the 1982 NHIS survey, we estimate that another 4 to 6 percent of children were enrolled in Medicaid sometime during 1991. This growth in Medicaid eligibility was due to additional expansion legislation and to a substantial increase in the number of children living in poverty during this time period (U.S. General Accounting Office, 1994).

In addition, there was an apparent decline in the percentage of Medicaid beneficiaries with other private and public health insurance from 1988 to 1991; 93 percent of enrollees had Medicaid coverage alone compared to 89 and 75 percent of enrollees in the 1982 and 1988 surveys, respectively. Part of this difference may be due to the different Medicaid coverage questions used in the different survey years. However, at least part of the decline also reflects a decrease in employer-sponsored health insurance coverage of children in low-income families over this time period (Rosenbaum, 1992; U.S. General Accounting Office, 1995; Dubay and Kenney, 1995).

While the NHIS data show that the percentage of all children who were in the low-income, insured category did not change from 1988 to 1991, the percentage of low-income children who were uninsured increased from 9.4 percent to 11.1 percent. This increase may be due to children covered by Medicaid earlier in the year but not at the time of the 1991 NHIS survey who were not identified as Medicaid children in the 1991 NHIS. However, it may also be due to the further impoverishment of the U.S. child population. There was a corresponding decline in the number of children in the moderate-to-high-income category – from 51.5 percent of all children in 1988 to 47.5 percent of all children in 1991, slightly below the 47.9 percent of all children in this category in 1982.

In summary, because of the legislated expansions in Medicaid eligibility, children covered by Medicaid comprised a growing percentage of the total U.S. child population in the decade from 1982 to 1991. While the percentage of uninsured children in low-income families fluctuated with economic conditions during this decade, the percentage of children covered by Medicaid increased steadily. In the following sections, we compare the distributions of children in each of the health insurance and income categories over demographic, geographic, and family

percent of children with Medicaid and other health insurance. There was also a difference in the racial mix among non-Medicaid insured and uninsured children in low-income families: 70.8 percent of non-Medicaid, low-income children who were insured were white while only 56.8 percent of non-Medicaid, low-income children with no health insurance were white. In addition, uninsured, low-income children had the highest percentage of Hispanic children (26.8 percent).

Similar patterns in the distributions by race/ethnicity of children in the different health insurance and income categories are evident in the 1988 and 1991 data. The one meaningful change from 1982 to 1988 was found for children with both Medicaid and other health insurance during the year. The increase in the number of children in this category was concentrated among the Hispanic and white populations: the percentage of children with Medicaid and other health insurance who were African American fell from 44.4 percent in 1982 to 28.2 percent in 1988 while the percentage who were Hispanics increased from 6.9 percent to 19.1 percent and the percentage of whites increased slightly from 45 percent to 46.3 percent. By 1991, the percentage of children who were Hispanics had increased from the 1982 levels in all health insurance and income groups.

3. Geographic Location

We also found important differences over health insurance and income groups, as well as changes over time, in the geographic location of children's residences. These differences point to important potential disparities in the accessibility of medical providers.

Region. During the study period, about one third of all children in the U.S. resided in the South. In 1982, the South had a disproportionately large share of uninsured children in low-income families (44 percent) and a disproportionately small percentage of Medicaid children (27 percent). The reverse was true for the Northeast where approximately 20 percent of all U.S. children resided in 1982, including 28 percent of all Medicaid children but only 13 percent of all uninsured children in low-income families.

4. Family Characteristics

Finally, we found significant differences in family structure and mothers' education and employment status among children in the different health insurance and income groups. These family characteristics reflect the availability of resources (e.g., caretaker time) and the knowledge necessary to make and carry out decisions to seek health care for children.

Family structure. Family structure differed substantially among children in the various health insurance and income categories. In 1982, the vast majority of children in families with moderate to high incomes (90.1 percent) lived in households with both parents; only 8.5 percent of these children lived with a single parent (with or without other adults). In contrast, less than one third of Medicaid children lived with both parents in 1982; approximately half lived with a single parent only; and around 10 percent lived with a single parent and other adults. Non-Medicaid, low-income children predominately lived with both parents, but the percentage was not as high as among children in families with higher incomes: 69.2 percent of low-income children with no insurance coverage and 79.8 percent of low-income children with health insurance coverage lived with both parents.

The family structure of non-Medicaid children did not change markedly from 1982 to 1991; there were slightly greater percentages of children living with only one parent in 1991 among children with no Medicaid coverage. On the other hand, the family structure of Medicaid children changed notably as expansion legislation opened up Medicaid eligibility to additional two-parent households. The percentage of children with Medicaid alone living in households with both parents increased from 28.7 percent in 1982 to 31.4 percent in 1988 and 35.2 percent in 1991. The percentage of children with Medicaid and other insurance living in households with both parents increased from 32.6 percent in 1982 to 45.9 percent in 1988 and 46.7 percent in 1991. Nevertheless, there continued to be more Medicaid children living in single-parent households compared to children in other health insurance and income groups.

Mother's education. In 1982, at least 87.7 percent of mothers of children in moderate-to-high-income families were high school graduates, and 42.5 percent had some college experience.

children from 1988 to 1991, except among low-income, insured children for whom 60.4 percent of mothers were working in 1988 and 62.7 percent of mothers were working by 1991.

5. Summary and Conclusions

Significant differences in the distributions of children in various health insurance and income groups over a variety of demographic, geographic, and family characteristics suggest that the health care-seeking behavior of Medicaid children may differ substantially from that of other low-income children and children in families with higher incomes. The specific differences in demographic, geographic, and family characteristics found among these groups of children are summarized below.

Compared to other low-income children, Medicaid children -

- were relatively more concentrated in the younger age groups;
- were more likely to be African American and less likely to be white or Hispanic in the early 1980s but by 1988 were also more likely to be Hispanic;
- were more likely to live in the Northeast and less likely to live in the South;
- were more likely to live in central cities of metropolitan areas and less likely to live in non-metropolitan areas;
- were more likely to live in single parent households with or without other adults but less likely to live in households with both parents;
- were less likely to have mothers who had graduated from high school and who had any college experience; and
- were less likely to have working mothers.

Compared to children in families with moderate to high incomes, Medicaid children –

- were relatively more concentrated in the younger age categories;

- The percentage of children with Medicaid increased in the South and declined in the Northeast while the percentage of uninsured, low-income children living in these regions remained approximately the same.

- The percentage of children living in nonmetropolitan areas declined in all health insurance and income groups.

- The percentage of Medicaid children who live in households with both parents increased.

- The percentages of mothers with high school diplomas and with some college education increased among children in all health insurance and income groups, with the largest increase among Medicaid mothers.

- The percentage of children with working mothers increased among all health insurance and income groups.

As mentioned above, these differences in the distributions of demographic, geographic, and family socioeconomic characteristics among the Medicaid child population and other populations of children have significant implications for the projected impact of further Medicaid expansions and/or a Federal or State health care reform plan to children not traditionally covered under Medicaid. Simply projecting the experience of traditional Medicaid recipients without adjusting for these differences may lead to erroneous results. To better understand the potential impact of these factors and the added impact of Medicaid coverage holding these factors constant, we ran multivariate regressions on selected health service use indicators. These analyses are described below, but first we investigate differences in the health status of children in the different health insurance and income groups.

TABLE 2

HEALTH STATUS INDICATORS FOR CHILDREN
BY HEALTH INSURANCE AND INCOME GROUP, 1982, 1988, AND 1991 NHIS

Health Status Indicators	Medicaid Alone	Medicaid and Other Insurance	Low-Income Uninsured	Low-Income and Other Insurance	Moderate to High Income
1982					
Number of acute conditions per 100 children	260.2	185.0	221.6	249.8	280.3
Percent of acute conditions medically attended	65.2	65.4	47.6	57.8	65.5
Percent of children limited in activity due to chronic conditions*	9.3	8.4	4.6	4.9	4.0
Perceived health status (percent)*					
Excellent health	33.7	37.8	44.1	46.6	60.9
Very good health	22.1	22.2	23.4	26.9	24.8
Good health	34.4	35.9	26.6	22.5	12.0
Fair to poor health	8.9	2.6	4.5	3.1	1.3
Unknown	0.9	1.5	1.5	0.9	1.1
1988					
Number of acute conditions per 100 children	309.0	382.1	233.1	260.4	312.5
Percent of acute conditions medically attended	65.9	74.5	52.2	61.2	68.8
Percent of children limited in activity due to chronic conditions*	9.7	8.7	5.2	5.7	4.6
Perceived health status (percent)*					
Excellent health	38.3	43.6	42.0	49.0	60.6
Very good health	25.2	21.6	26.6	28.6	24.7
Good health	29.0	27.6	24.6	19.1	12.5
Fair to poor health	6.6	6.4	4.9	2.6	1.4
Unknown	1.0	0.9	1.9	0.7	0.7

contacted a medical provider for approximately the same proportion of acute condition (65.2 percent vs. 65.5 percent).

The incidence of acute conditions increased steadily over the decade for children in all health insurance and income groups, except the Medicaid and other insurance group whose incidence of acute conditions fluctuates over the years. The fluctuations are likely due to the smaller number of children in this category and the varying composition of the group over the years. Furthermore, while the incidence of acute conditions increased for uninsured children in low-income families, the increase was small relative to the increases among children in the other health insurance and income groups. Nevertheless, the same general pattern over health insurance and income groups prevalent in 1982, was evident in 1988 and 1991. These increases may not all be due to increasing health problems; they may in part be due to differences in the survey questionnaire and/or changes in health care-seeking behavior over the study period. All subgroups of children, except those with Medicaid and other insurance, had higher percentages of their acute conditions medically attended in 1991 than in 1982. Changes in health care-seeking behavior are investigated below in multivariate analyses.

2. Prevalence of Activity Limitations from Chronic Conditions

Medicaid children were about twice as likely to be limited in activity due to chronic conditions (health conditions lasting three or more months) compared to other children. In 1982, 9.3 percent of children with Medicaid alone and 8.4 percent of children with both Medicaid and other insurance were limited in activity due to chronic conditions compared to 4.6 percent of uninsured children in low-income families, 4.9 percent of insured children in low-income families, and 4.0 percent of children in higher income families. This finding is not surprising given that Medicaid covers blind and disabled persons receiving SSI payments.

The same general patterns of disability among the different subgroups of children evident in 1982 persisted in 1988. However, children in all health insurance and income groups were more likely to be restricted in activity due to chronic conditions. The prevalence of activity limitations among Medicaid children and uninsured, low-income children increased again from

TABLE 3

PERCENTAGE OF CHILDREN WITH ACTIVITY LIMITATIONS AND IN FAIR TO POOR HEALTH BY AGE AND HEALTH INSURANCE AND INCOME GROUP, 1982, 1988 and 1991 NHIS

	Medicaid	Low-Income Uninsured	Low-Income and Other Insurance	Moderate to High Income	All Children[1]
1982					
Percentage limited in activity due to chronic conditions					
< 7 years	4.2	1.7	3.7	2.2	2.8
7-12 years	11.6	7.5	7.4	4.8	6.4
13-17 years	14.3	7.3	5.3	5.7	6.3
Percentage in fair to poor health					
< 7 years	7.8	2.7	2.7	1.6	2.8
7-12 years	8.6	3.9	4.2	0.9	3.0
13-17 years	9.8	11.0	4.0	2.0	3.9
1988					
Percentage limited in activity due to chronic conditions					
< 7 years	5.0	3.0	3.6	2.5	3.2
7-12 years	14.0	6.5	6.9	5.8	7.0
13-17 years	13.5	7.1	7.7	6.3	7.1
Percentage in fair to poor health					
< 7 years	5.1	5.2	3.0	1.7	2.9
7-12 years	7.2	2.9	2.2	1.0	2.4
13-17 years	9.1	6.8	2.7	1.5	3.2
1991					
Percentage limited in activity due to chronic conditions					
< 7 years	5.6	3.2	2.8	2.0	3.0
7-12 years	14.6	6.9	5.8	5.7	7.0
13-17 years	18.0	10.5	9.5	5.9	8.3
Percentage in fair to poor health					
< 7 years	5.7	2.6	1.8	1.4	2.5
7-12 years	5.1	4.1	1.1	1.1	2.1
13-17 years	7.1	5.8	2.6	1.2	2.9

[1] The 'All Children' category includes children for whom insurance/income is unknown.

*The *p*-value for the chi-squared test for equality in the distribution over the different health insurance and income groups is ≤ 0.001 for both outcome variables and each age category.

children reported in fair to poor health was most evident in school-aged children, despite the concurrent growth in the proportion of these children with activity limitations due to chronic conditions.

4. Summary and Conclusions

Differences in the distributions of children in various health insurance and income groups over a variety of health status measures suggest that the health of Medicaid children may differ substantially from that of other low-income children and children in families with higher incomes. Children enrolled in Medicaid had more activity limitations due to chronic health problems and were perceived by parents and guardians to be in poorer relative health compared to other groups of children. In addition, while Medicaid children had a higher incidence of acute conditions than other low-income children, they were not more likely than children in moderate-to-high-income families to have a higher incidence of acute conditions or to see a physician for these conditions. Furthermore, given their higher prevalence of chronic conditions, the care sought and received by Medicaid children could have differed significantly from the care sought and received by children in higher income families. The specific differences in health status found among these groups of children are summarized below.

Compared to other low-income children, Medicaid children –

- had a higher incidence of acute conditions;
- were more likely to have contacted a physician for acute conditions;
- were more likely to be limited in activity due to chronic conditions; and
- were less likely to be reported in excellent health and more likely to be reported in fair to poor health.

Compared to children in families with moderate to high incomes, Medicaid children –

- had a similar incidence of acute conditions;
- were equally likely to have contacted a physician for acute conditions;

- Despite the concurrent increase in activity limitations, lower proportions of teenagers in all health insurance and income groups were reported in fair to poor health.

TABLE 4

PHYSICIAN CONTACTS
BY HEALTH INSURANCE AND INCOME GROUP, 1982, 1988, and 1991 NHIS

Health Service Use Indicators	1982[1]				
	Medicaid Alone	Medicaid and Other Insurance	Low-Income Uninsured	Low-Income and Other Insurance	Moderate to High Income
Physician Contacts					
Percent of children with any physician contacts	81.8	81.2	65.0	72.4	80.9
Number of physician contacts per child	4.6	6.0	2.5	3.7	5.0
Percent of Contacts that Were*					
Telephone	14.1	---	19.0	17.5	18.0
Doctor's office	41.0	45.6	45.6	52.8	61.5
Hospital outpatient clinic or doctor's office in hospital	15.4	---	11.2	6.3	4.1
Hospital emergency room	7.8	---	4.5	6.1	5.4
Other	21.4	---	18.9	17.0	10.8
Unknown	0.4	---	0.9	0.2	0.3
Percent of Contacts With*					
Pediatricians	29.8	---	32.1	27.9	36.5
Other primary care physician	40.7	---	40.6	34.3	26.7
Other physician	14.9	---	11.1	16.4	17.5
Non-physician	12.9	---	13.2	19.5	16.8
Unknown	1.7	---	2.9	1.9	2.5

[1]The 1982 and 199*i* data are age and gender adjusted to match the 1988 child population.

*The p-value for the chi-squared test for equality in the distributions among the different child populations is <0.001.

NOTES: -- Denotes sample size of these figures is not large enough for statistical reliability.

TABLE 4

PHYSICIAN CONTACTS
BY HEALTH INSURANCE AND INCOME GROUP, 1982, 1988, and 1991 NHIS
(Continued)

Health Service Use Indicators	1991[1]				
	Medicaid Alone	Medicaid and Other Insurance	Low-Income Uninsured	Low-Income and Other Insurance	Moderate to High Income
Physician Contacts					
Percent of children with any physician contracts	84.4	88.7	66.4	78.9	85.1
Number of physician contacts per child	5.4	4.4	2.7	4.0	6.2
Percent of Contacts that Were*					
Telephone	8.6	---	13.0	14.9	17.6
Doctor's office	55.5	43.3	49.7	58.7	64.9
Hospital outpatient clinic or doctor's office in hospital	9.8	---	13.8	9.0	6.7
Hospital emergency room	8.4	---	11.1	6.7	3.5
Other	16.9	---	12.4	10.5	6.6
Unknown	0.8	0.000000	0.000000	0.2	0.7
Percent of Contacts With*					
Pediatricians	33.1	---	23.6	32.0	39.7
Other primary care physician	33.9	---	40.7	36.7	27.7
Other physician	19.7	---	14.2	12.2	12.7
Non-physician	9.2	---	15.8	13.4	15.0
Unknown	4.0	0.000000	5.7	5.7	4.9

[1]The 1982 and 1991 data are age and gender adjusted to match the 1988 child population.

*The p-value for the chi-squared test for equality in the distributions among the different child populations is <0.001.

NOTES: -- Denotes sample size of these figures is not large enough for statistical reliability.

among children with Medicaid alone from 1982 to 1988 and again from 1988 to 1991, but at a lower rate than among children in families with moderate th high incomes, widening the gap between the number of contacts made by or for these children (5.4 visits) and the number made by or for children in families with moderate to high incomes (6.2 visits).

Settings of Care. There were also differences in the settings of physician contacts among children in the different health insurance and income groups. Fewer of the contacts made by or for Medicaid children were telephone calls and more of them were face-to-face visits. Visits made by Medicaid children were more likely to be in institutional settings (e.g., hospital outpatient departments and emergency rooms), clinics, and public health departments and less likely to be in physician offices than visits made by children in families with moderate to high incomes. In 1982, 41 percent of physician contacts made by or for children with Medicaid coverage alone and 61.5 percent of physician contacts made by or for children in families with moderate to high incomes were office visits. The distribution of physician contacts over settings of care among uninsured children from low-income families was closer to that of Medicaid children than that of children from families with higher incomes; 45.6 percent of the contacts made by or for low-income, uninsured children were office visits. Children in families with low incomes and some insurance coverage other than Medicaid were more likely than other low-income children and less likely than children in higher income families to visit physicians in their offices; 52.8 percent of these children's physician contacts were office visits in 1982.

The patterns of physician contacts over settings of care for children in the different health insurance and income groups changed over time, particularly for children in low-income families. Medicaid children with no other health insurance coverage made relatively fewer telephone contacts and more visits to physician offices in 1988 and 1991 than in 1982. The percentage of physician contacts made by or for children with both Medicaid and some other health insurance that were office visits decreased from 45.6 percent in 1982 to 37.4 percent in 1988 but increased to 43.3 percent in 1991. These fluctuations are likely due to the varying composition of this group discussed earlier.

reasonable. Uninsured, low-income children also had a higher percentage of physician contacts with specialists in 1991 than in 1982, but insured, low-income children had a lower percentage of contacts with specialists at the end of the decade compared to the beginning. In addition, uninsured children from low-income families had the highest percentage of physician contacts with non-physicians among the health insurance and income groups in 1991, whereas they had the lowest, except for Medicaid children, in 1982.

2. Usual Source of Care

In the 1988 NHIS-CHS, respondents were asked whether the child had a usual source of routine care, whether s/he had a usual source of illness-related care, the types of usual sources of routine and illness-related care, and whether the sources of care for routine and illness-related care were the same. An identifiable source of care is believed to be a necessary component of adequate access to health care services and may have important costs and quality implications as well. An identifiable source of care is believed to increase continuity in care and decrease the costs of care by reducing waiting times for appointments, eliminating duplicate diagnostic services, and encouraging greater compliance with recommended schedules for preventive care and maintenance treatment for chronic conditions. Individuals without a usual source of care are believed to use less preventive care and to experience greater delays in receiving illness-related care and, therefore, to need costly emergency care more frequently than individuals with a usual source of care.

The site of the usual source of care also may have cost and quality implications. Services provided in hospital outpatient facilities are generally more costly than services provided in other ambulatory settings. However, in a recent study of claims and medical record reviews for a Maryland Medicaid population, Starfield et al. (1994) found hospital outpatient facilities to score no better on overall quality and slightly worse on access measures than office-based practices or community health centers. The responses to the 1988 NHIS-CHS usual-source-of-care questions are shown for children by health insurance and income group in Table 5.

Percentage with a Usual Source of Care. The vast majority of children were reported to have usual sources of routine and illness-related care, with a slightly higher percentage of children having a usual source of illness-related care than a usual source of routine care. Uninsured, low-income children were the least likely to have a reported source of routine care (76.9 percent) and of illness-related care (81.0 percent). Children in families with moderate to high incomes were the most likely to have a usual source of both routine care (93.6 percent) and of illness-related care (95.8 percent). Medicaid children were almost as likely as children in moderate-to-high-income families to have a usual source for routine care (89.1 percent of those with Medicaid alone and 89.5 percent of those with Medicaid and other insurance) and of illness-related care (91.4 percent of those with Medicaid alone and 93.2 percent of those with both Medicaid and other health insurance). Children with Medicaid alone and uninsured children in low-income families were the least likely to use the same place as their usual source for routine and illness-related care (78.4 percent and 75.8 percent, respectively), suggesting greater discontinuity in health care compared to other children. Among children in families with moderate to high incomes, 90.7 percent reported having the same place as a usual source for routine and illness-related care.

Type of Usual Source of Care. While all groups of children reported physicians' offices most frequently as their usual source of routine care, Medicaid children were much less likely to report a physician's office than were children in families with moderate to high incomes; 53.5 percent of children with Medicaid alone and 51.3 percent of children with both Medicaid and other health insurance reported physicians' offices as their usual source of routine care while 80.7 percent of children in families with moderate to high incomes did so. However, uninsured children from low-income families were even less likely to report physicians' offices as usual sources of routine care (45.1 percent). Medicaid children and uninsured children in low-income families were much more likely to report a neighborhood clinic as their usual source of routine care; approximately 21 percent of these children reported neighborhood clinics as their usual source of routine care compared to 10.2 percent of low-income children with other public or private insurance and 3.6 percent of children in higher income families. Medicaid children and uninsured children in low-income families were also much more likely to report hospital outpatient departments as their usual source of routine care.

TABLE 6

HOSPITALIZATIONS BY HEALTH INSURANCE AND INCOME GROUP, 1982, 1988, and 1991 NHIS

Health Service Use Indicators[1]	Medicaid Alone	Medicaid and Other Insurance	Low-Income Uninsured	Low-Income and Other Insurance	Moderate to High Income
1982					
Percent of children with a short-stay hospital episode	7.8	8.9	3.4	5.0	4.4
Number of short-stay hospital episodes per 100 children	10.3	10.5	3.8	6.1	5.2
Number of hospital days in short-stay hospitals per 100 children	77.8	142.0	19.3	33.3	23.0
Average length of stay	7.6	13.3	4.6	4.7	4.3
1988					
Percent of children with a short-stay hospital episode	8.1	7.8	1.8	3.2	3.2
Number of short-stay hospital episodes per 100 children	10.3	11.2	2.4	4.2	4.1
Number of hospital days in short-stay hospitals per 100 children	53.6	104.1	10.9	23.8	20.0
Average length of stay	5.2	9.3	4.5	5.7	4.9
1991					
Percent of children with a short-stay hospital episode	6.6	5.8	3.5	3.5	2.9
Number of short-stay hospital episodes per 100 children	8.2	7.5	4.5	4.0	3.4
Number of hospital days in short-stay hospitals per 100 children	48.4	77.9	20.4	18.5	17.0
Average length of stay	6.4	11.9	4.5	4.6	4.9

[1]The 1982 and 1991 data are age and gender adjusted to match the 1988 child population.

For non-Medicaid children in low-income families, average lengths of stay were unchanged from 1982 to 1991, and they increased slightly for children in moderate-to-high-income families. For Medicaid children, average lengths of stay were considerably shorter in 1988 compared to 1982 but rose somewhat in 1991. For children with Medicaid alone, the average length of hospital stay was 6.4 days in 1991 - significantly higher than those of non-Medicaid children in low-income families (4.5 days for the uninsured and 4.6 for the insured) and children in families with moderate to high incomes (4.9 days).

4. Dental Visits

Despite the many advances in oral health during the 1970s and 1980s, dental caries remain one of the most common preventable and treatable diseases of childhood (Edelstein and Douglass, 1995; Brown et al., 1995). Dental care for children are required services under EPSDT. However, significant differences exist among States in the dental services offered children through the Medicaid and EPSDT programs. Many State programs fail to adequately cover "basic" dental services (U.S. Congress, 1990). Furthermore, the Medicaid and EPSDT programs are plagued by low dental provider participation (Hill and Zimmerman, 1995; Capilouto, 1991). To determine whether Medicaid coverage improved access to dental care among low-income children and whether it provided access equal to that of children in families with moderate to high incomes, despite these problems, we broke out the dental care information for two-to-six-year olds on the 1991 NHIS-CHS by the health insurance and income categories. We present these data in Table 7.

Percentage with Visits. In 1991, 38.5 percent of children with Medicaid alone had at least one dental visit in the 12 months prior to the survey. This is somewhat higher than the 31.6 percent of uninsured, low-income children but slightly lower than the 41.8 percent of insured, low-income children and substantially lower than the 56.2 percent of children in moderate-to-high-income families.

Number of Visits. The same relative pattern among health insurance and income groups is seen for the number of dental visits per 100 children, except that Medicaid children had

slightly more visits than low-income children with other insurance coverage. This latter result is due to a slightly higher number of visits per Medicaid child with visits (2.0 visits) compared to the other subgroups of children with visits (1.7 visits).

Thus, Medicaid coverage increased the use of dental care among children in low-income families who would otherwise be uninsured, but not at levels comparable to those of children in higher income families. Given the greater dental care needs of low-income children documented in other studies (Edelstein and Douglass, 1995), our finding suggests that significant barriers to dental care remained even with Medicaid coverage.

5. Immunizations

The final service use measure that we investigated is the receipt of immunizations among Medicaid children under six years of age. Childhood immunizations are among the safest and most cost-effective measures of preventing a variety of infections. Failure to achieve adequate and timely rates of immunization among young children risks outbreaks of serious diseases with resulting increases in unnecessary death and disability (Lewit and Mullahy, 1994; Institute of Medicine, 1994).

Proof of immunization is required for school entry at age five or six years. This requirement has successfully led to more than 95 percent of children receiving all recommended immunizations by the time they enter school. However, no such broad requirement exists for younger children. As a result, based on the 1991 NHIS-CHS, only 37 percent of two-year-olds were fully immunized for the seven diseases in the basic childhood immunization series (Lewit and Mullahy, 1994).[17] This was far short of the objective of the Public Health Service for 90

[17] The basic series consists of four doses of diphtheria, tetanus and pertussis (DTP) vaccine recommended at ages two, four, six, and 18 months; three doses of oral polio vaccine (OPV) recommended at ages two, four, and 18 months; and one dose of measles, mumps and rubella (MMR) vaccine recommended at age 15 months.

TABLE 8

PERCENTAGE OF CHILDREN UNDER SIX YEARS OF AGE UP-TO-DATE IN IMMUNIZATIONS[1] FOR CHILDHOOD DISEASES BY HEALTH INSURANCE AND INCOME GROUP AND AGE, 1991 NHIS

	Medicaid Alone	Medicaid and Other Insurance	Low-Income Uninsured	Low-Income and Other Insurance	Moderate to High Income	All Children[2]
All Children Aged under Six Years						
Diphtheria-tetanus-pertussis (DTP) - 4 doses at 2, 4, 6 and 18 mos.	45.5%	53.3%	48.3%	58.3%	59.1%	53.6%
Oral polio vaccine (OPV) - 3 doses at 2, 4 and 18 mos.	55.1	56.8	57.6	66.1	68.5	62.7
Measles, mumps and rubella (MMR) - 1 dose at 15 mos.	85.5	68.5	85.5	91.7	92.6	89.6
Haemophilus influenza type b (Hib) - 1 dose at 18 mos.	71.2	68.9	67.4	67.4	74.2	70.7
Haemophilus influenza type b - 3 doses at 2, 4 and 15 mos.	11.3	9.9	8.6	10.6	14.6	12.6
All childhood immunizations, except Hib - 4 DTP, 3 OPV, and 1 MMR	40.0	46.7	42.6	52.0	53.0	47.9
All childhood immunizations - 4 DTP, 3 OPV, 1 MMR and 1 Hib	34.8	40.5	33.3	38.4	43.9	39.0

TABLE 8
PERCENTAGE OF CHILDREN UNDER SIX YEARS OF AGE UP-TO-DATE IN IMMUNIZATIONS[1] FOR CHILDHOOD DISEASES BY HEALTH INSURANCE AND INCOME GROUP AND AGE, 1991 NHIS
(continued)

	Medicaid Alone	Medicaid and Other Insurance	Low-Income Uninsured	Low-Income and Other Insurance	Moderate to High Income	All Children[2]
Children Aged Three to Five Years						
Diphtheria-tetanus-pertussis (DTP) - 4 doses at 2, 4, 6 and 18 mos.	46.4%	***	51.3%	61.6%	58.6%	54.1%
Oral polio vaccine (OPV) - 3 doses at 2, 4 and 18 mos.	60.0	***	68.0	64.7	68.0	62.2
Measles, mumps and rubella (MMR) - 1 dose at 15 mos.	87.3	***	87.3	92.4	93.1	90.3
Haemophilus influenza type b (Hib) - 1 dose at 18 mos.	61.1	***	60.8	57.8	64.9	61.2
Haemophilus influenza type b - 3 doses at 2, 4 and 15 mos.	5.3	***	4.2	5.7	6.9	6.0
All childhood immunizations, except Hib - 4 DTP, 3 OPV, and 1 MMR	43.0	***	47.5	56.7	53.5	49.7
All childhood immunizations - 4 DTP, 3 OPV, 1 MMR and 1 Hib	34.1	***	32.2	35.9	38.9	35.3

NOTE: Chi-squared tests of differences in the percentages of children immunized across the health insurance and income groups were significant with p-values $\leq$ 0.003 for all immunizations, except the one-shot Hib among children aged 3-5 years which had a p-value = 0.04.

*** Sample size too small for reliable estimates.

[1]Children are counted as immunized if they had all the recommended immunizations for their age group, regardless of whether or not they received them at the recommended age intervals.

[2]The All Children column includes data for the 10 percent of sample children under six years with unknown income and/or health insurance information.

those aged three to five years. The only difference is that insured, low-income children were slightly more likely to be on track for their DTP immunization than other children, bringing their combined basic series completion rate above that for children aged three to five years in families with moderate to high incomes.

Verification with 1992 Data. Because the analysis of immunization completion rates appears to tell a different story than the other service use measures, we reran the analysis using the 1992 NHIS-CHS data to verify our results. For the 1992 survey, NCHS changed the way in which responses based on parental recall were handled (Lewit and Mullahy, 1994). In 1991, parents were required to specify the exact ages at which vaccinations were administered for the full number of doses to be credited. Beginning in 1992, a parental response that a child had received all doses of a particular vaccine was accepted even if the dates of the immunizations were not specified. (This change had the effect of increasing the immunization completion rates.) If Medicaid parents simply had a greater recall problem for dates of their children's immunizations than parents of other children, our 1991 finding would be revealed as an artifact.

The immunization completion rates based on the 1992 data are presented in Appendix Table A-5. These rates are higher for the vaccines requiring multiple administration. For all children under six years of age, the DTP completion rate rose from 53.6 percent to 60.6 percent, the OPV completion rate rose from 62.7 percent to 68.6 percent, and the three-dose Hib completion rate rose from 12.6 percent to 29.3 percent. At the same time, the completion rate for the single-dose MMR immunization dropped from 89.6 percent to 80.6 percent and the percentage of children with at least one Hib dose was unchanged. Because of the improvement in the DTP and OPV rates, the combined basic series completion rate excluding the Hib vaccine increased from 47.9 percent in 1991 to 55.7 percent in 1992, and when the single-dose Hib is included, it increased from 39 percent in 1991 to 46.8 percent in 1992.

Table A-5 also shows the completion rate for the hepatitis B virus (HBV) vaccine, which was recommended for children at birth and ages two and 18 months beginning in 1992. Only 8.8 percent of children under six years of age had received the recommended number of HBV doses for their age that year.

While the immunization completion rates are higher with the 1992 NHIS-CHS data, the pattern over health insurance and income groups is similar to that seen with the 1991 NHIS-CHS data. The combined basic series immunization completion rate, excluding Hib and HBV, was 51.9 percent for children with Medicaid alone, which was not very different from the 50.8 percent rate among uninsured children in low-income families, but was substantially lower than the 60.6 percent rate for children in moderate-to-high-income families. Looking at the rates for children under three years of age, the pattern across health insurance and income groups was somewhat closer to that of other measures. The 47.1 percent completion rate of the basic series (excluding Hib and HBV) among children with Medicaid alone was somewhat higher than the rates for either of the other two low-income groups, which were 44.7 percent for uninsured, low-income children and 45.5 percent for insured, low-income children. However, the rate for Medicaid infants and toddlers remained considerably below the 55 percent rate for infants and toddlers in moderate-to-high-income families.

6. Summary and Conclusions

We compared a variety of health service use measures over groups of children defined by their health insurance coverage and income category. These measures included both illness-related and preventive care indicators. They were not adjusted for differences in health status or demographic, geographic, and family characteristics known to affect health-care seeking behavior. Thus, they reflected the combined impact of children's financial status and the various confounding factors associated with financial status.

For the illness-related measures - physician contacts and hospitalizations - we found Medicaid children to have higher utilization levels than other low-income children. In addition, while Medicaid children had higher hospital use than children in moderate-to-high-income families, they had fewer outpatient contacts and received care in different settings. Therefore, while Medicaid coverage may have improved access to care for low-income children who would otherwise be uninsured, these data suggest that the access provided was not comparable to that of children in higher income families.

The discrepancy in access to health care between the Medicaid children and children in moderate-to-high-income families is accentuated by the much poorer relative performance of Medicaid children on the preventive care measures we investigated - dental care and immunizations. The poor relative performance of Medicaid children in their immunization completion rates is particularly notable. It suggests that children enrolling in Medicaid have a significant backlog of missed immunizations from earlier ages.

The specific differences in health services use that we found among children in the different health insurance and income groups are summarized below.

Compared to other low-income children, Medicaid children –

- were more likely to have had at least one physician contact and had more physician contacts per child;
- made a smaller proportion of their physician contacts by telephone;
- were more likely to make physician contacts in institutional settings and less likely to make these contacts in physician offices than either the uninsured or the insured in 1982, but this was true only when compared to the insured in 1988 and 1991;
- were more likely to consult a physician and less likely to consult a non-physician for medical care;
- were more likely to have both a usual source of routine care and a usual source of illness-related care;
- were more likely than uninsured children and less likely than children with other public or private health insurance to use the same source for both routine and illness-related care;
- had similar distributions of usual sources of care as uninsured children, but considerably different distributions from insured children whose distributions of reported usual sources of care matched more closely that of children in moderate-to-high-income families;
- were more likely to be hospitalized and had more hospitalizations and hospital days per 100 children and longer average lengths of stay;

- were more likely than the uninsured and as likely as the insured to have had at least one dental visit from ages two to six years, but had more dental visits per 100 children aged two to six years than either insurance group; and

- were less likely to have received recommended immunizations during their pre-school years.

Compared to children in families with moderate to high incomes, Medicaid children –

- were equally likely to have had at least one physician contact, but had fewer physician contacts per child;

- made a smaller proportion of their physician contacts by telephone;

- were more likely to make physician contacts in institutional settings and less likely to make these contacts in physician offices;

- were less likely to have consulted pediatricians and more likely to have consulted other primary care physicians although this trend diminished over time;

- were slightly less likely to have a usual source of routine care and a usual source of illness-related care;

- were less likely to use the same source for routine and illness-related care;

- were less likely to report a physician's office and more likely to report either a neighborhood clinic or a hospital outpatient department as their usual source of routine or illness-related care;

- were more likely to be hospitalized and had more hospitalizations and hospital days per 100 children and longer average lengths of stay;

- were less likely to have had at least one dental visit from ages two too six years and had fewer dental visits per 100 children in this age group; and

- were less likely to have received recommended immunizations during their pre-school years.

In addition to the differences in health service use over children in the different health insurance and income groups, we found changes in children's health service use over the study period. However, changes regarding the Medicaid and other low-income populations are confounded by the many legislative changes in the Medicaid program during this time period and

cannot be attributed to any one change. As discussed earlier, legislated changes in eligibility criteria greatly changed the composition of the Medicaid child population and that of other low-income groups with respect to demographic, socioeconomic and health status characteristics. Other legislation during this time – in particular OBRA-89 – was aimed at increasing provider participation and service coverage as well. All of these changes were intended to improve access to care for low-income children. The impact of the Medicaid program can be seen in the changing settings of care among Medicaid children – by the end of the period, a significant portion of Medicaid children's care had shifted from hospital outpatient settings to physicians' offices. However, that increased access was achieved is questionable due to the increased use of emergency rooms among Medicaid and uninsured low-income children.

Further complicating the analysis are the dramatic changes that took place in the health care system itself during this period. These changes include the implementation of increased prospective payment, utilization review, and other managed care techniques. The result of these latter changes is seen in substantially reduced numbers of hospitalizations with an accompanying increase in outpatient physician contacts toward the end of the ten-year study period compared to the 1982 base year.

The specific changes over time that we found in children's health service use are summarized below.

From 1982 to 1991, the following changes were evidenced in the health service use of Medicaid and other child populations:

- All health insurance and income subgroups of children were more likely to have had at least one physician contact.
- Uninsured children in low-income families and, to a lesser extent, Medicaid children were more likely to use emergency rooms for physician contacts while children in moderate-to-high-income families were less likely to use emergency rooms.
- Medicaid children were more likely to contact physicians in their offices and less likely to contact them in institutional settings.

- Medicaid children were more likely to consult pediatricians and specialists and less likely to consult other primary care physicians.

- All health insurance and income groups of children were less likely to have had a hospital episode.

- The average length of hospital stay declined for Medicaid children but not for non-Medicaid children.

F. COMPARISON OF HEALTH SERVICE USE INDICATORS: MULTIVARIATE ANALYSIS

In the analyses above, we found that children in the various health insurance and income groups had different health care needs and different distributions across demographic, geographic, and family characteristics believed to affect health care-seeking behavior. Therefore, much of the observed differences in health service use among children may be explained by these other factors; the impact of financial barriers may diminish or disappear when these other factors are taken into consideration. To determine the relative contribution to health service use of the demographic, geographic, and family factors and the impact of Medicaid coverage holding these factors constant, we conducted multivariate analyses of selected health service use measures. These measures include physician contacts, dental visits, and immunization status.

For both physician contacts and dental visits, we used a two-part model. As mentioned above, the two-part model separates out the decision to seek care from the decision on the amount of care to receive. We estimated the probability of any contacts/visits and of the number of contacts/visits given that at least one contact/visit was made separately in logistic and ordinary least squares (OLS) regressions, respectively. For immunization status, we estimated the probability that the child was up to date in his/her basic childhood immunization series with a single logistic regression. In addition, for the physician contact analysis, we pooled the observations from the three data years.[19] For dental visits and immunization status, we had data for only 1991.

We included seven types of independent variables in the regression equations: (1) the health insurance and income group of the child; (2) Medicaid program characteristics; (3) demographic characteristics of the child; (4) characteristics of the child's family; (5) indicators of the child's health status; (6) characteristics of the child's residence; and (7) provider supply variables. In addition, to test for changes in the coefficients over time, we

[19] We also ran these regressions separately for each year of data, but found no significant changes over time in the coefficients held constant in the pooled regressions. See Appendix Tables A-6 and A-7.

allowed the intercept, the coefficients of the health insurance and income groups, and the coefficients of the Medicaid program characteristics to vary by year in the pooled equations. The expected signs of the coefficients for each independent variable in the various equations are summarized in Table 9. The variables and the hypotheses surrounding their expected signs are briefly discussed below.

Financial barrier designation. We entered four of the five mutually exclusive health insurance and income groups into the regression equations to test the main hypotheses of the study. The omitted category was children in families with incomes above 200 percent of the FPL. We hypothesized that Medicaid provides access to care equal to that provided to children in moderate-to-high-income families, and therefore that the coefficients for the two Medicaid categories in each equation would not be significantly different from zero. We also expected to find income effects among children in the other low-income categories. Thus, we predicted that the variables for both categories of low-income children without Medicaid coverage would have negative coefficients. Furthermore, because insurance picks up much of the costs of health care for insured, low-income children, we expected the uninsured group to have a larger negative impact than the insured group. We expected a negative coefficient for insured, low-income children because of the substantial cost-sharing provisions contained in most non-Medicaid plans. We also expected the coefficient of the Medicaid groups to be significantly higher than that of uninsured, low-income children. We tested this latter hypothesis with a linear restriction and a Wald F test adjusted for the complex sampling design of the NHIS survey. Finally, we hypothesized that changes in the Medicaid program improved children's access to care and, therefore, expected the coefficients for the Medicaid groups to increase over time.

Medicaid program characteristics. In addition to the Medicaid coverage variables, we added two variables reflecting the relative eligibility and reimbursement generosity of the States' Medicaid programs, respectively. (We also included interaction terms for these variables and the health insurance and income group variables.) The first variable is the ratio of the AFDC payment standard for a family of two to the FPL for a family of two. A higher payment standard would bring children in relatively better off families into the Medicaid program. Assuming that health care is a normal good (i.e., the quantity of the good consumed increases with income) and

TABLE 9

PREDICTED SIGNS OF THE INDEPENDENT VARIABLES IN THE REGRESSION EQUATIONS

Independent Variables	Dependent Variables				
	Prob. of Any Physician Contacts	Number of Physician Contacts	Prob. of Any Dental Visits	Number of Dental Visits	Prob. Up-to-Date in Immunizations
Financial barriers (moderate to high income left out)					
Medicaid only	0	0	0	0	0
Medicaid and other insurance	0	0	0	0	0
Low-income uninsured	--	--	--	--	--
Low-income insured	-	-	-	-	-
Medicaid program characteristics					
AFDC payment standard	0	0	NA	NA	NA
AFDC payment standard X Medicaid coverage	+ in 1982 0 in 1991	+ in 1982 0 in 1991	NA	NA	NA
AFDC payment standard X low-income uninsured	- in 1982 0 in 1991	- in 1982 0 in 1991	NA	NA	NA
AFDC payment standard X low income insured	0	0	NA	NA	NA
Medicaid fee generosity index	0	0	NA	NA	NA
Medicaid fee generosity index X Medicaid coverage	+	+	NA	NA	NA
Medicaid fee generosity index X low income unins'd	0	0	NA	NA	NA
Medicaid fee generosity index X low income insured	0	0	NA	NA	NA
Demographic characteristics					
Gender and Age Group (female, 13-17 years left out)					
Male, ≤ 12 months	+++	+++	NA	NA	NA
Male, 1-2 years	++	++	NA	NA	NA
Male, 3-6 years	+	+	NA	NA	NA
Male, 7-12 years	0	0	NA	NA	NA
Male, 13-17 years	-	-	NA	NA	NA
Female, ≤ 12 months	++	++	NA	NA	NA
Female, 1-2 years	+	+	NA	NA	NA
Female, 3-6 years	+	+	NA	NA	NA
Female, 7-12 years	0	0	NA	NA	NA
Age (continuous variable)	NA	NA	+	+	+
Male (female left out)	NA	NA	0	0	0
Race (white left out)					
African-American	-	0	-	0	0
Hispanic	-	0	-	0	0
Other	?	0	?	0	0

TABLE 9

PREDICTED SIGNS OF THE INDEPENDENT VARIABLES IN THE REGRESSION EQUATIONS
(Continued)

Independent Variables	Dependent Variables				
	Prob. of Any Physician Contacts	Number of Physician Contacts	Prob. of Any Dental Visits	Number of Dental Visits	Prob. Up-to-Date in Immunizations
Health status					
Perceived health status (fair to poor left out)					
Excellent	-	- -	0	+	0
Very good	-	-	0	+	0
Good	0	-	0	+	0
Limited in activity (not limited left out)	+	+	0	-	0
Number of bed disability days	+	+	0	-	0
Hospitalized during the year (not hospitalized left out)	NA	+	NA	NA	NA
Family characteristics					
Single parent household (additional adults left out)	-	0	-	-	-
Number of siblings under 18 years	-	-	NA	NA	NA
First-born child	NA	NA	+	+	+
Mother's education (some college left out)					
Not a high school graduate	- -	- -	–	–	–
High school graduate	-	-	-	-	-
Mother is employed (unemployed left out)	?	?	?	?	?
Geographic identifiers					
Region (West left out)					
Northeast	0	0	0	0	0
Midwest	0	0	0	0	0
South	0	0	0	0	0
Urban/Rural (rural left out)					
Large urban, inner city	0	0	0	0	0
Large urban, suburban	+	+	+	+	+
Medium-sized urban	+	+	+	+	+
Small urban	+	+	+	+	+
Provider supply variables					
Index of children per child health provider	-	-	-	-	-
Emergency room per square mile	+	+	NA	NA	NA

that there are positive costs to receiving care for Medicaid enrollees (e.g., transportation and time), we expected a positive income effect and thus a greater probability of any physician contacts and a greater number of physician contacts during the survey year for children in States with higher AFDC payment standards.

However, because of the Medicaid expansions that occurred in the latter part of the study period, we expected the impact of the AFDC payment standard variable to change over time. With the expansions, eligibility became less dependent on the income requirements of the AFDC and SSI programs. While cash assistance recipients typically enroll in Medicaid at the time of their cash assistance application, and therefore, their enrollment is independent of the decision to seek health care, this is not true for children eligible under the expansions and other non-cash eligibility categories. Children not eligible as cash assistance recipients might only enroll in Medicaid when a medical need arises, and therefore, they would have a higher probability of physician contacts and a greater average number of contacts. The lower the AFDC payment standard the greater is the proportion of Medicaid children enrolled under poverty-related expansion categories. Thus, the AFDC payment standard may not only have less significance in 1988 and 1991 compared to 1982, but may also have had a negative rather than a positive impact on utilization, depending on whether the income effect or the enrollment effect was dominant.

The second Medicaid program variable is a proxy measure of Medicaid program reimbursement generosity. We expected this variable to have a positive coefficient in both equations of our model; that is, we expected higher relative fees to increase the probability that a Medicaid child had any physician contacts and to increase the number of physician contacts made during the year. We did not expect any changes in the elasticity of demand over time. However, if providers of expansion children are more responsive to fee increases than providers of

traditional Medicaid children, as suggested by Fossett et al. (1992),[20] we may see more significant and larger positive coefficients in the later years of the decade.

To measure the full impact of the Medicaid program on the probability and number of physician contacts, the estimated effects of these program variables must be added to the estimated effect of the child's health insurance and income group variable. We present both the individual variable and the combined effects. Finally, while we tested these Medicaid program variables in the dental care and immunization equations, we expected and found no significant effects, and therefore, we report equations without them.

Demographic characteristics of the child. We did not expect a linear effect of age in the physician contact equation, and therefore, we entered nine gender/age groups into the regressions, omitting females aged 13 to 17 years. The AAP periodicity schedule of well-child visits recommends more frequent visits at younger ages, with infants (children ≤ 12 months of age) having the greatest number of recommended visits, followed by toddlers (children aged 1-2 years). Therefore, we expected younger children to have positive coefficients in both equations - infants to have the largest positive coefficients and toddlers to have the next largest coefficients. Furthermore, because female teenagers may begin to see physicians for gynecological or pregnancy-related reasons, we expected the coefficient for males aged 13 to 17 years to be negative.

NCHS collected dental visit information only for children aged from two to six years, and immunization information only for children under six years of age. Therefore, we entered a single continuous age variable in these equations with a dichotomous variable for gender. We expected all three dependent variables - the probability of any dental visits, the number of

[20] Their hypothesis rests on the fact that traditional Medicaid enrollees are concentrated in inner city areas, where there are few physicians, while expansion children are dispersed more widely across geographic areas that contain greater numbers of providers who can respond to policies, such as higher reimbursement rates, aimed at improving children's access to care. In the regressions, we hold constant both a measure of physician availability and a measure of the level of urbanization of the child's county of residence.

dental visits, and the probability the child was up to date in his/her immunizations - to increase with age and to be independent of gender.

We entered three race/ethnicity variables - one each for African American, Hispanic, and other non-white - into the regressions, omitting the "white" category. We expected African American and Hispanic children to be less likely than white children to enter the health care system but to have the same number of contacts once care was sought and a provider identified. Therefore, we expected negative coefficients for the African American and Hispanic variables in the equations for the probability of any physician contacts and the probability of any dental visits, and coefficients not significantly different from zero in the equations for the number of physician contacts, the number of dental visits, and the probability the child was up to date in his/her immunizations.

Characteristics of the child's family. Different characteristics of the child's family, such as the presence of both parents, the number of siblings, and the mother's education and employment status, can affect the accessibility of health care. Thus, we entered several variables to control for these factors. We predicted that single parent households, the presence of additional siblings under age 18, and mothers with less education would all have independent negative impacts on all of our measures of health service use. Working mothers would have less time to bring children to health care providers but would have more income to spend on health care services for their children. Therefore, the net impact of the mother's employment on children's heath service use could be either negative or positive depending on which effect was dominant.

In the 1991 file, we were able to compute a variable indicating whether the child was the first born (e.g., oldest) child in the household. Therefore, in the dental care and immunization status equations, we used this variable in place of the number of siblings variable. We expected its coefficient to be positive; that is, we expected parents to be more diligent in providing preventive care to their first-born children.

Health status. We entered several measures of the child's health status into the regression equations, including perceived health status (omitting fair to poor health), whether the child was limited in activity due to chronic conditions, and the number of bed disability days. In the regression for the number of physician contacts, we also included a variable indicating whether the child was hospitalized during the year. We expected less healthy children, children with disabilities, and children with more bed disability days to have a higher probability of any physician contacts and a higher number of contacts on average compared to other children. In addition, we expected children who had been hospitalized to have had a greater number of physician contacts compared to children with no hospitalizations during the year.

We also predicted that the greater number of medical services required for sick children would crowd out some, but not all, dental care. Therefore, we predicted small negative effects of the health status measures in the equation for the number of dental visits. We did not expect a significant impact of health status on either the probability of dental care or the probability the child was up to date in his/her immunizations.

Characteristics of child's residence. We included two sets of geographic identifiers in the equations -- region and an urban/rural continuum code. We made no *a priori* hypotheses on the signs of the coefficients of the region variables; we omitted the West region. However, we expected children residing in non-inner city urban and suburban areas to have greater accessibility to providers compared to children living in rural areas. We omitted the rural designation and, therefore, we expected positive coefficients for these variables in all five equations. Furthermore, because of the fewer number of physicians who locate their offices in inner cities, we expected children residing in inner cities of urban areas to be less likely to have contacted a physician or a dentist and to have fewer physician contacts, dental visits, and immunizations than children in other urban and suburban areas, but no fewer than children living in nonmetropolitan areas.

Provider supply. We entered two provider supply variables to the equations. The first is the county-level ratio of the number of children under 15 years of age to the number of child health care providers. The second is the number of emergency rooms per square mile in the

child's county of residence. We expected greater provider supply to be positively related to the probability of any physician contacts and the number of physician contacts. Therefore, we expected negative coefficients for the children to provider ratio and positive coefficients for the emergency room variable.

We also assumed medical providers encouraged children to seek dental care and administered needed immunizations. Therefore, we expected the same impact of the children-to-provider ratio in the dental visit and immunization equations as in the physician contact equation although of a somewhat smaller magnitude. We did not enter the emergency room variable into the dental and immunization equations.

1. Probability of Any Physician Contacts

The results of the pooled logistic regression on the dichotomous variable indicating whether the child had any physician contacts during the year are shown in Table 10. Few of the financial barrier and Medicaid program variables were significant. In 1982 and 1988, Medicaid children were no more or less likely than children in moderate-to-high-income families to have contacted a physician. However, in 1991, Medicaid children were more likely to have contacted a physician than children in the moderate-to-high-income category. This latter result may be reflecting the endogeneity of Medicaid enrollment and health service use; that is, the fact that many children enroll in Medicaid only when they need services. This phenomena should be stronger in 1991 than in the earlier years due to the greater proportion of Medicaid enrollees not receiving cash payments and thus enrolling when they had an urgent medical need. The phenomena should also be stronger among children with both Medicaid and other insurance than among children with Medicaid alone because of the greater proportion of expansion children in the former category.[21] The results support both hypotheses.

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[21] See *Appendix Tables for the Medicaid Expansions Enrollment and Expenditure Report.* Prepared for the Health Care Financing Administration. Washington, DC: The MEDSTAT Group, August 15, 1995.

TABLE 10

POOLED LOGISTIC REGRESSION OF THE PROBABILITY OF ANY PHYSICIAN CONTACTS AND OLS REGRESSION OF THE NUMBER OF PHYSICIAN CONTACTS AMONG CHILDREN WITH CONTACTS, 1982, 1988 and 1991 NHIS

	Probability of Any Physician Contacts		Number of Physician Contacts	
	Beta	s.e.	Beta	s.e.
1982	1.54***	0.40	8.26***	0.89
1988	1.44***	0.31	8.60***	0.65
1991	1.13***	0.32	7.92***	0.64
Financial barriers (moderate to high income left out)				
Medicaid only, 1982	-0.09	0.76	-0.79	1.18
1988	-0.34	0.55	0.36	0.87
1991	1.40*	0.63	-0.71	0.93
Medicaid and other insurance, 1982	0.38	0.87	-0.50	1.24
1988	-0.07	0.62	-0.09	0.95
1991	2.09**	0.71	0.18	1.40
Low-income uninsured, 1982	-1.65*	0.74	-3.26***	0.86
1988	-0.04	0.49	-3.10**	1.02
1991	-0.24	0.53	-1.55	1.08
Low-income insured, 1982	0.31	0.47	0.30	1.16
1988	0.04	0.42	-1.16*	0.56
1991	0.27	0.36	-0.38	0.79
Medicaid program characteristics				
AFDC payment standard, 1982	-0.27	0.38	-0.46	0.62
1988	0.04	0.24	-0.76	0.44
1991	0.69	0.46	-0.14	0.55
AFDC payment standard X Medicaid coverage, 1982	0.69	0.79	2.58*	1.27
1988	0.06	0.47	0.45	0.88
1991	-1.89	1.05	1.13	1.38
AFDC payment standard X Low-income uninsured, 1982	1.09	0.81	2.47***	0.88
1988	-0.33	0.52	2.26	1.16
1991	-0.55	0.82	1.19	1.53
AFDC payment standard X Low-income private insurance, 1982	-0.39	0.55	-0.35	1.38
1988	0.50	0.47	0.90	0.57
1991	-0.55	0.61	0.52	1.09
Medicaid fee index, 1982	-0.08	0.20	-0.16	0.43
1988	0.22	0.18	-0.16	0.30
1991	0.34*	0.14	0.11	0.24
Medicaid fee index X Medicaid coverage, 1982	-0.12	0.45	-1.07	0.78
1988	0.03	0.47	-1.04	0.66
1991	-0.79	0.43	0.84	0.71

TABLE 10

POOLED LOGISTIC REGRESSION OF THE PROBABILITY OF ANY PHYSICIAN CONTACTS AND OLS REGRESSION OF THE NUMBER OF PHYSICIAN CONTACTS AMONG CHILDREN WITH CONTACTS, 1982, 1988, and 1991 NHIS (Continued)

	Probability of Any Physician Contacts		Number of Physician Contacts	
	Beta	s.e.	Beta	s.e.
Medicaid fee index X Low-income uninsured, 1982	0.37	0.44	1.19*	0.57
1988	-0.63	0.40	1.18	0.75
1991	-0.39	0.33	0.46	0.81
Medicaid fee index X Low-income private insurance, 1982	-0.46	0.28	-0.68	0.62
1988	-0.84**	0.29	0.34	0.44
1991	-0.42	0.24	0.12	0.74
Gender and Age Group (female, 13-17 years left out)				
Male, ≤ 12 months	2.07***	0.17	2.03***	0.16
Male, 1-2 years	2.04***	0.13	2.18***	0.15
Male, 3-6 years	0.94***	0.08	0.70***	0.14
Male, 7-12 years	0.02	0.07	0.34*	0.15
Male, 13-17 years	-0.02	0.07	0.02	0.16
Female, ≤ 12 months	1.89***	0.16	2.23***	0.16
Female, 1-2 years	2.15***	0.14	2.29***	0.20
Female, 3-6 years	0.83***	0.08	0.69***	0.14
Female, 7-12 years	0.04	0.07	-0.18	0.13
Race (White left out)				
African-American	-0.27***	0.06	-0.86***	0.11
Hispanic	-0.04	0.06	-0.39***	0.11
Other	-0.21	0.11	-0.30	0.21
Perceived health status (fair to poor left out)				
Excellent	-0.64***	0.17	-5.00***	0.54
Very good	-0.44**	0.17	-4.25***	0.54
Good	-0.33*	0.17	-3.44***	0.54
Limited in activity (not limited left out)	0.68***	0.11	2.94***	0.29
Number of bed disability days	0.20***	0.02	0.18***	0.03
Hospitalized in the past year (not hospitalized left out)	—	—	1.71***	0.43
Single parent household	0.02	0.05	-0.03	0.12
Number of siblings under 18 years	-0.08**	0.03	-0.20***	0.04
Mother's education (some college left out)				
Not a high school graduate	-0.54***	0.06	-0.69***	0.12
High school graduate	-0.27***	0.05	-0.42***	0.08
Mother is employed (unemployed left out)	-0.07	0.04	-0.08	0.07

TABLE 10

POOLED LOGISTIC REGRESSION OF THE PROBABILITY OF ANY PHYSICIAN CONTACTS AND OLS REGRESSION OF THE NUMBER OF PHYSICIAN CONTACTS AMONG CHILDREN WITH CONTACTS, 1982, 1988, and 1991 NHIS (Continued)

	Probability of Any Physician Contacts		Number of Physician Contacts	
	Beta	s.e.	Beta	s.e.
Region (west left out)				
Northeast	0.51***	0.07	-0.05	0.11
Midwest	0.30***	0.06	-0.06	0.12
South	0.09	0.08	-0.18	0.15
Urban/rural (rural left out)				
Large urban, inner city	0.25***	0.07	-0.13	0.12
Large urban, suburban	0.16*	0.06	0.25	0.13
Medium sized urban	0.17**	0.06	-0.04	0.10
Small urban	-0.01	0.08	-0.10	0.15
Index of children per child health provider	-0.12*	0.05	-0.34***	0.10
Emergency room per square mile	0.01	0.00	0.01	0.01
Sample size	33,748		27,828	
Approximate chi-square	18,963.6***		---	
Multiple R-square	---		0.192	
Satterwaite adjusted F, overall model	75.7***		269.0***	

* p-value ≤ 0.05
** p-value ≤ 0.01
*** p-value ≤ 0.001

Low-income, uninsured children were significantly less likely to contact a physician compared to children in moderate-to-high-income families in 1982, but they were no more or less likely in either of the two other years. Recall that in the descriptive analysis, we found a significantly smaller percentage of low-income, uninsured children with any physician contacts in all three years. The multivariate results suggest that the discrepancies in the percentages in the latter two years were due to differences in health status and demographic, family, and geographic characteristics among the two groups of children. That is, while financial barriers to care were significant among low-income, uninsured children in 1982, legislation expanding Medicaid coverage to low-income children had removed much of the financial barriers by 1988, but significant non-financial barriers remained.

The only Medicaid program characteristics with significant coefficients in the logistic equation of the probability of any physician contacts is the Medicaid fee index which has a significant, positive coefficient in 1991. A 10 percent higher fee was associated with a 3.5 percent higher probability of a physician contact. In addition, in the 1988 equation, the interaction term for the Medicaid fee index and the insured, low-income group has a significant, negative coefficient, suggesting that higher Medicaid fees may have resulted in a "crowding out" of health care services for other low-income children that year.

To determine the total impact of Medicaid, we computed the log-odds ratio for children assuming different values for the AFDC payment standard and the Medicaid fee generosity variables, as shown in Table 11.[22] In 1982 and 1988, as predicted, children with Medicaid coverage alone were no more or less likely than moderate-to-high-income children to contact a physician, and it mattered little whether the child resided in a State with generous or stringent AFDC financial eligibility standards or generous or stringent Medicaid fees. By 1991, Medicaid enrollment appears to have increased the probability of any physician contacts relative to children with little or no financial barriers and residence in a State with stringent eligibility standards for

[22] The figures we used were the 25th, 50th and 75th percentiles for these variables in 1982. Similar values were prevalent in 1988, but the 1991 values for the AFDC payment standard were significantly lower due to the increasing FPL and AFDC payment standards that increased little, if at all, over time.

Table 11

LOG-ODDS RATIO OF THE PROBABILITY OF PHYSICIAN CONTACTS BY HEALTH INSURANCE AND INCOME GROUP AND STATE MEDICAID PROGRAM CHARACTERISTICS, 1982, 1988 AND 1991 NHIS

	1982				1988				1991			
	Medicaid		Low-Income		Medicaid		Low-Income		Medicaid		Low-Income	
Program Characteristics	Only	& Other Insurance	Uninsured	Other Insurance	Only	& Other Insurance	Uninsured	Other Insurance	Only	& Other Insurance	Uninsured	Other Insurance
Stringent eligibility												
Stringent fees	0.93	1.48	0.31	0.77	0.86	1.13	0.67	0.84	2.02	4.03	0.80	1.31
Average fees	0.90	1.44	0.32	0.71	0.90	1.18	0.63	0.76	1.88	3.75	0.79	1.29
Generous fees	0.85	1.36	0.35	0.61	0.96	1.26	0.56	0.64	1.66	3.31	0.78	1.26
Average eligibility												
Stringent fees	0.98	1.57	0.34	0.70	0.88	1.15	0.64	0.91	1.71	3.41	0.81	1.33
Average fees	0.95	1.52	0.36	0.64	0.91	1.19	0.60	0.82	1.59	3.17	0.81	1.31
Generous fees	0.90	1.44	0.39	0.55	0.98	1.28	0.54	0.69	1.40	2.80	0.80	1.29
Generous eligibility												
Stringent fees	1.07	1.71	0.40	0.62	0.89	1.17	0.61	1.01	1.34	2.68	0.84	1.37
Average fees	1.04	1.66	0.42	0.57	0.93	1.22	0.57	0.92	1.25	2.49	0.83	1.35
Generous fees	0.98	1.57	0.46	0.49	1.00	1.31	0.51	0.77	1.10	2.20	0.82	1.32

cash assistance reinforced this trend. Again, we suspect this reflects a greater proportion of the children enrolling in Medicaid only when medical needs arose.

Table 11 shows that, in all three years, children with both Medicaid and other insurance were relatively more likely to contact a physician than children in the moderate-to-high-income group. This result was attenuated somewhat in 1988 when the passage of the Child Support Enforcement Act increased the number of AFDC recipients with other health insurance coverage. But by 1991, children with both Medicaid and other insurance were two to four times more likely to contact a physician than children in moderate-to-high-income families. The adjusted Wald F test of the equality of the intercept, financial barrier and Medicaid program variables were significant for all three pairs of years, with p-values of 0.001 for 1982 compared to 1988, 0.005 for 1982 compared to 1991, and 0.04 for 1988 compared to 1991.

Most of our other predicted results with respect to the directions and magnitudes of the effects of characteristics of the child and the child's family are supported by the regression results. In particular, younger children whether male or female had higher probabilities of having any physician contacts. Infants were as likely as children aged from one to two years to have consulted a physician during the preceding 12-month period, and both groups were significantly more likely than older children to have contacted a physician. Children aged three to six years were also more likely than older children, but less likely than infants and toddlers to have contacted a physician. The probabilities of any physician contacts for males over six years and females aged from seven to 12 years were not significantly different from that of females 13 to 17 years of age. African-American children were less likely than white children to have seen a physician in the previous 12 months.

Single parent household and mother's employment status had no statistically significant effects on the probability of contacting a physician for their children. On the other hand, the presence of siblings had a significant negative, though small, impact. The mother's level of education had a larger significant effect, with mothers with no college experience less likely to

consult a physician for their children than those with some college experience and those without a high school diploma less likely than mothers with a diploma (with p-values < 0.005).[23]

Many of the health status variables were significant and all had the expected signs. Children perceived as less healthy by their primary caregiver, children with activity limitations from chronic conditions, and children with more bed disability days during the year were all more likely to have had a physician contact during the previous 12 months.

There were some differences in the probability of any physician contacts among children residing in different geographic areas. Children living in the Northeast and Midwest regions were more likely to have consulted a physician than children living in the South or the West. Children living in inner city urban areas and other large and medium-sized urban and suburban areas were more likely to have consulted a physician compared to children living in rural areas. Furthermore, the coefficient for inner city residence is larger than the coefficients for other large and medium-sized urban residence. This result is contrary to our predictions. However, our urban/rural continuum variable flags a whole county containing an inner city neighborhood as "inner city" and therefore represents a mix of inner city and other urban. In addition, our hypothesis rested on the lower accessibility of private physicians, neglecting the availability of public providers.

The ratio of children to child health providers in the child's county of residence has the expected significant, negative sign. The coefficient of the variable for emergency rooms per square mile is insignificant but has the predicted positive sign.

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[23] Because we include no income variables in the regressions besides whether the child lives in a family below 200 percent of the FPL, these results may be reflecting a permanent income effect. Education of household head is often used as a proxy for a family's ability to leave poverty.

2. Number of Contacts among Children with Contacts

The results of the pooled OLS regression on the number of physician contacts made by or for children with contacts during the year are shown in Table 10 also. From these results, we see that, after holding constant health status and various other characteristics, children with Medicaid coverage who had contacted a provider at least once made approximately the same number of physician contacts as children in families with moderate to high incomes. The only financial barrier categories with statistically significant effects on the number of physician contacts made by children with contacts were the uninsured and insured, low-income groups. In 1982 and 1988, uninsured, low-income children had significantly fewer physician contacts than children in moderate-to-high-income families. In 1988, insured, low-income children had fewer contacts as well, but the discrepancy was not as large as among uninsured children. An adjusted Wald F test for the equality of the coefficients for the Medicaid and uninsured, low-income categories shows uninsured, low-income children also had significantly fewer physician contacts than Medicaid children in 1982 and 1988.

The uninsured, low-income group variable had a negative coefficient for 1991 as well, but the magnitude of the impact was only half that of the coefficients for 1982 and 1988, and the variance was greater. The uninsured, low-income group coefficient also was not significantly different from the coefficient of the Medicaid variable in 1991. These results provide further evidence of the absence of significant financial barriers among low-income children following the Medicaid eligibility expansions of the late 1980s and early 1990s.

The only Medicaid program characteristics that were statistically significant in these equations are the interaction of the AFDC payment standard with the Medicaid enrollee variable and the interactions of the AFDC payment standard and the Medicaid fee index with the uninsured, low-income variable in 1982. The combined effects of Medicaid enrollment and program characteristics are shown in Table 12 as the difference in the number of visits made by Medicaid and other low-income children compared to children in families with moderate-to-high-incomes. Of note is the change over time from Medicaid children with fewer visits than children in moderate-to-high-income families to Medicaid children with slightly more visits than

Table 12

DIFFERENCE IN THE MEAN NUMBER OF PHYSICIAN CONTACTS BY HEALTH INSURANCE AND INCOME GROUP AND STATE MEDICAID PROGRAM CHARACTERISTICS, 1982, 1988 AND 1991 NHIS

Program Characteristics	1982				1988				1991			
	Medicaid		Low-Income		Medicaid		Low-Income		Medicaid		Low-Income	
	Only	& Other Insurance	Uninsured	Other Insurance	Only	& Other Insurance	Uninsured	Other Insurance	Only	& Other Insurance	Uninsured	Other Insurance
Stringent eligibility												
Stringent fees	-0.9	-0.6	-1.9	-0.5	-0.5	-1.0	-1.9	-1.0	0.2	1.1	-0.8	-0.1
Average fees	-1.1	-0.8	-1.8	-0.6	-0.7	-1.2	-1.8	-1.0	0.4	1.3	-0.7	-0.1
Generous fees	-1.4	-1.1	-1.5	-0.9	-1.0	-1.5	-1.5	-0.9	0.7	1.5	-0.6	0.0
Average eligibility												
Stringent fees	-0.6	-0.3	-1.6	-06	-0.6	-1.0	-1.7	-1.0	0.4	1.3	-0.7	-0.1
Average fees	-0.8	-0.5	-1.5	-0.8	-0.7	-1.2	-1.6	-0.9	0.5	1.4	-0.6	0.0
Generous fees	-1.1	-0.8	-1.2	-1.0	-1.1	-1.5	-1.3	-0.9	0.8	1.7	-0.4	0.1
Generous eligibility												
Stringent fees	-0.1	0.2	-1.2	-0.8	-0.6	-1.1	-1.4	-0.9	0.6	1.5	-0.5	0.0
Average fees	-0.3	0.0	-1.1	-0.9	-0.8	-1.3	-1.3	-0.9	0.7	1.6	-0.4	0.1
Generous fees	-0.7	-0.4	-0.8	-1.2	-1.1	-1.6	-1.0	-0.9	1.0	1.9	-0.2	0.1

the children in higher income families by 1991. For Medicaid children, the AFDC payment standard had the expected effects in 1982 and 1991 and no effect in 1988. However, the fee level had the opposite effect than expected in 1982 and 1988, and only in 1991, did the fee variable have the expected positive impact.[24] By the end of the decade, Medicaid children in States with stringent AFDC eligibility standards and Medicaid fees had approximately the same number of visits as children in families with moderate to high incomes while Medicaid children in States with generous AFDC eligibility standards and Medicaid fees had one visit more per year on average.

In Table 12, we also can clearly see the impacts of Medicaid program characteristics on uninsured, low-income children. A higher AFDC payment standard and a higher Medicaid fee level dampened the negative effect of being an uninsured child from a low-income family. In 1982, an uninsured, low-income child in a State with stringent AFDC eligibility standards and stringent Medicaid provider fees had almost two fewer visits on average compared to children in higher income families, while uninsured, low-income children in States with relatively generous AFDC eligibility standards and Medicaid fees had less than one fewer visit. The effects were similar in 1988 but were considerably smaller in 1991, reflecting the changing Medicaid eligibility and physician reimbursement policies during this period. The adjusted Wald F test of equality of the coefficients over time show no statistically significant changes between 1982 and 1988 (p-value = 0.38) or between 1988 and 1991 (p-value = 0.09), but over the whole decade there was a significant change in the coefficients (p-value = 0.001).

The results from the OLS regression in Table 10 provide evidence supporting many of our predictions on the direction and magnitude of the effects of different demographic and socioeconomic characteristics of children and their families on the level of children's physician contacts. In particular, younger children had significantly more physician contacts on average compared to older children; African-American and Hispanic children had significantly fewer visits than white children; the number of siblings had a significant, negative impact on the

[24] This supports the hypothesis by Fossett et al. (1992) that Medicaid fee increases will have a greater effect on access to care among expansion enrollees because they reside in areas with greater numbers of physicians.

number of physician contacts; and higher levels of education among children's mothers resulted in greater numbers of physician contacts among children.

We did not find support for other predicted results. Teenaged males consulted physicians with the same relative frequency as female teens, holding other factors constant. The coefficients for the single-parent household and mother's employment status variables were not statistically significant. Furthermore, no statistically significant differences in the level of physician contacts were found among children residing in different geographic areas, defined either by region or by the urban/rural continuum code.

Health status indicators were by far the most important and significant determinants of the number of physician visits. Children perceived by their primary caretakers as in poor to fair health had five more contacts per year on average compared to children perceived to be in excellent health; children limited in activity due to a chronic condition had three more contacts a year on average compared to children with no activity limitations; and children who were hospitalized during the year had one to two more contacts on average compared to children who were not hospitalized. Furthermore, on average, children had an additional physician contact for every six bed disability days. Finally, both provider supply variables have the predicted signs in the three equations, but only the index of children to child health care providers is significant.

3. The Probability of Any Dental Visits

The final three regression results can be found in Table 13. The first of these equations is the probability of any dental visits among children aged from two to six years. The financial barrier variables were very significant in this equation. Children aged two to six years in all low-income groups, except children with both Medicaid and other public or private insurance, were significantly less likely than children in the higher income group to have visited a dentist in 1991. Children with Medicaid alone and children in low-income families with other health insurance were almost half as likely to have had a dental visit in 1991 compared to children in higher income families. The log-odds ratio computed from the coefficient of the variable for children with Medicaid alone was 0.54 with a 95 percent confidence interval of 0.38 to 0.76, and the

TABLE 13

REGRESSION ANALYSIS OF DENTAL CARE AND IMMUNIZATION STATUS, 1991 NHIS

	Probability of Any Dental Visits Among Two-to-Six-Year-Olds		Number of Dental Visits Among Two-to-Six-Year-Olds With Visits		Probability of Being Up-To-Date in Immunizations Among Children Under Six Years	
	Beta	s.e.	Beta	s.e.	Beta	s.e.
Intercept	-2.01***	0.46	1.38***	0.27	0.01	0.33
Financial barriers (moderate to high income left out)						
Medicaid only	-0.62***	0.17	0.30	0.21	-0.39***	0.11
Medicaid and other insurance	-0.19	0.47	0.10	0.28	0.02	0.28
Low-income uninsured	-0.95***	0.20	0.00	0.16	-0.39**	0.12
Low-income insured	-0.58***	0.13	-0.06	0.10	-0.12	0.09
Age	0.69***	0.03	0.09*	0.03	0.12***	0.02
Male (female left out)	-0.03	0.09	-0.12	0.08	0.09	0.07
Race (white left out)						
African-American	-0.12	0.18	-0.10	0.11	-0.42**	0.13
Hispanic	-0.48***	0.13	0.05	0.14	0.04	0.10
Other	-0.47	0.26	0.34	0.23	-0.24	0.16
Perceived health status (fair to poor left out)						
Excellent	-0.01	0.38	0.02	0.18	-0.09	0.26
Very good	-0.17	0.37	0.01	0.19	-0.17	0.25
Good	-0.04	0.37	0.13	0.19	-0.20	0.25
Limited in activity (not limited left out)	0.13	0.25	-0.09	0.17	0.44	0.23
Number of bed disability days	-0.01	0.01	-0.00	0.00	-0.01	0.01
First-born child in household	-0.21*	0.09	-0.06	0.08	0.24***	0.07
Single parent household	0.20	0.14	-0.20	0.11	-0.30**	0.11
Mother's education (some college left out)						
Not a high school graduate	-0.57**	0.18	0.15	0.14	-0.34**	0.12
High school graduate	-0.48***	0.10	0.12	0.10	-0.04	0.09
Mother is employed (unemployed left out)	0.04	0.08	0.11	0.09	-0.19**	0.06
Region (West left out)						
Northeast	0.26	0.19	-0.11	0.13	-0.27*	0.13
Midwest	0.48**	0.16	0.11	0.14	0.06	0.13
South	-0.11	0.16	0.01	0.12	0.11	0.13

TABLE 13

REGRESSION ANALYSIS OF DENTAL CARE AND IMMUNIZATION STATUS, 1991 NHIS
(Continued)

	Probability of Any Dental Visits Among Two-to-Six-Year-Olds		Number of Dental Visits Among Two-to-Six-Year-Olds With Visits		Probability of Being Up-To-Date in Immunizations Among Children Under Six Years	
	Beta	s.e.	Beta	s.e.	Beta	s.e.
Urban/rural (rural left out)						
Large urban, inner city	-0.09	0.16	-0.11	0.14	0.12	0.14
Large urban, suburban	-0.21	0.16	0.16	0.16	-0.04	0.14
Medium sized urban	-0.18	0.16	-0.10	0.12	-0.12	0.14
Small urban	-0.11	0.20	-0.18	0.13	-0.38*	0.17
Index of children per child health provider	-0 .01	0.14	-0.05	0.10	0.27	0.15
Sample size	3,778		1,737		4,940	
Approprimate chi-squared	969.67***				282.17***	
R^2			0.03			
Satterwaite adjusted F, overall model	16.55***		133.26***		5.68***	

* p-value ≤ 0.05
** p-value ≤ 0.01
*** p-value ≤ 0.001

log-odds ratio for other insured, low-income children was 0.56 with a 95 percent confidence interval of 0.44 to 0.72. Uninsured, low-income children were even less likely to have visited a dentist with a log-odds ratio of 0.39 and a 95 percent confidence interval of 0.26 to 0.57. However, an adjusted Wald F test of the equality of the coefficients of the Medicaid and uninsured, low-income group variables was not significant (p-value=0.15).

Besides the financial barrier variables, the child's age, race/ethnicity, birth order, and mother's education level had significant effects on the probability that preschool-aged children received any dental care. The older the child the more likely s/he was to have had some dental care; African-American children were less likely than white children to have had any dental care; and children whose mothers had some college education were more likely than children whose mothers had only a high school diploma or who had not finished high school to have had any dental care during the year. Furthermore, in contrast to our predicted result, first-born children were less likely than children with older siblings to have visited a dentist in 1991 (presumably because mothers make appointments for all children at the same time). Finally, children in the Midwest were more likely to have visited a dentist than children in the West.

4. The Number of Dental Visits

As seen in the descriptive analysis above, there was little variation in the number of dentist visits made by preschool-aged children with visits in 1991. Children in this age range with visits averaged 1.7 dental visits during the 12 months preceding the NHIS interview. The only significant coefficient in the multivariate regression analysis of this variable is for the age variable, and it is small in magnitude.

Medicaid coverage had a positive effect, holding all other factors constant, but the coefficient was not statistically different from zero, indicating that Medicaid children had the same number of visits on average as children in moderate-to-high-income families. However, an adjusted Wald F test of the equality of the coefficients for the Medicaid and insured, low-income groups was marginally significant (p-value=0.05), suggesting that Medicaid children did have a

somewhat larger average number of visits compared to other insured children in low-income families.

5. The Probability of Completing the Basic Immunization Series

Finally, we ran a logistic regression on the dichotomous variable indicating whether the child was up to date in his/her basic series immunizations. We used the Year 2000 goal definition of three DTP, three OPV, and one MMR. This schedule has one less DTP shot than recommended by the AAP, but shows the same trends as the four-shot series. Because the 1991 NHIS immunization data are known only for preschoolers, this regression was restricted to children under six years of age.

Both children with Medicaid alone and uninsured children in low-income families were two-thirds as likely as children in moderate to high income families to have received all immunizations in the basic series recommended for their age group. The log-odds ratios for both groups were 0.68 with a 95 percent confidence interval of approximately 0.53 to 0.86. Thus, Medicaid coverage did not significantly impact the immunization status of preschool-aged children relative to uninsured, low-income children, and Medicaid children were significantly less likely to have completed the basic series compared to children in moderate-to-high-income families. An adjusted Wald F test of equality of the coefficients of the Medicaid coverage and insured, low-income variables, show that Medicaid children were significantly less likely to have had completed the series compared to children in low-income families with other public or private coverage (p-value=0.04).

Many demographic and socioeconomic characteristics of the child and the child's family were significant in the immunization status equation. Older preschoolers were significantly more likely to have completed the series. In addition, white children were more likely than African-American children to have completed the series (p-value=0.001); first-born children were more likely than children of other birth orders; children living in two-parent households were more likely than children in single-parent households; children whose mothers had graduated from high school were more likely than children whose mothers had not obtained high school

diplomas; and children whose mothers were not working were more likely than those whose mothers were working to have completed the basic Year 2000 series immunizations. Finally, in contrast to our expected results, we found children residing in small urban areas were less likely than children residing in other inner cities or rural areas to have received their basic childhood immunizations.

6. Summary and Conclusions

In this chapter, we ran multivariate regression analyses on several of the illness-related and preventive care use measures from the NHIS files to determine whether the trends found in the descriptive analyses persisted after holding constant children's health status and selected demographic, geographic, and family characteristics. Our goal was to evaluate the success of the Medicaid program in improving access to care among low-income children, to determine whether Medicaid children's access to care was comparable to that of children in families with moderate to high incomes, and to determine what other factors were significantly related to children's health service use.

With respect to the relative health service use of Medicaid children, we found the following results.

Compared to other low-income children, Medicaid children –

- were more likely to have contacted a physician, had a greater number of physician contacts per child with contacts, and had an equal or greater number of dental visits per child aged two to six with visits; but
- were equally likely to have visited a dentist from age two to six and were equally likely to be up to date in the basic immunization series in the preschool years.

Compared to children in families with moderate to high incomes, Medicaid children –

- were less likely to have visited a dentist and were less likely to be up to date in the basic immunization series in the preschool years; but

- were equally likely to have contacted a physician, had an equal number of physician contacts per child with contacts, and had an equal number of dental visits per child aged two to six with visits.

Because Medicaid program eligibility criteria and provider incentives vary by State. we added variables in the physician contact equations to determine whether the impact of Medicaid coverage varied by the generosity of either the eligibility criteria or provider reimbursement levels. We found –

- cash assistance payment standards had a declining negative influence on the number of physician contacts over the ten-year study period; and
- higher Medicaid fees were associated with a higher probability and number of physician contacts only in 1991.

In summary, we found that Medicaid did improve access to at least illness-related care among children in low-income families, and that in 1991, higher fees increased physician contacts among Medicaid children. However, we did not find improved access to preventive care from Medicaid coverage.[25] In addition, there were significant other barriers to care that prevented Medicaid children from utilizing either illness-related or preventive care services at levels significantly higher than other low-income children, and/or at levels equal to children in higher income families. The consistent negative impacts found for African-American children and children whose mothers had only a high school education and the disproportionately large percentage of Medicaid eligible children with these characteristics is a concern. In particular, we found the following results.

Compared to white children, African-American children –

- were less likely to have contacted a physician, had fewer physician contacts per child with contacts, and were less likely to be up to date in the basic immunization series in the preschool years; but

[25] This finding differs from that of our study of the 1987 National Medical Expenditure Survey. This discrepancy will be explored in the synthesis report.

- were equally likely to have visited a dentist from age two to six and had an equal number of dental visits per child aged two to six with visits.

Compared to children whose mothers had some college education, children whose mothers only had a high school diploma or who had not graduated from high school –

- were less likely to have had any physician contacts, had fewer contacts per child with contacts, were less likely to have any dental visits from age two to six, and were less likely to be up to date in their basic immunizations in the preschool years; but

- had an equal number of dental visits per child aged two to six with visits.

These results suggest that significant outreach and education programs are needed to achieve equal access to care for these children.

Finally, we found evidence that Medicaid enrollment and health care use are simultaneously determined. Therefore, the questions addressed here should be investigated more closely using models that take the endogeneity of Medicaid enrollment into consideration.

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APPENDIX TABLES

TABLE A-1

INCOME LEVELS APPROXIMATING 200 PERCENT OF THE FEDERAL POVERTY LEVEL, 1982, 1988 AND 1991 NHIS

	Income Level					
	1982		1988		1991	
Family Size	200% FPL[1]	NHIS	200% FPL[1]	NHIS	200% FPL[1]	NHIS
1	$10,038	$10,000	$12,310	$12,000	$14,172	$14,172
2	12,974	13,000	15,916	16,000	18,330	18,330
3	15,386	15,000	18,870	19,000	21,720	21,720
4	19,724	20,000	24,184	25,000	27,848	27,848
5	23,368	25,000	28,608	30,000	32,912	32,912
6	26,414	30,000	32,292	35,000	37,174	37,174
7	30,072	30,000	36,464	40,000	42,186	42,186
8	33,438	35,000	40,506	40,000	47,064	47,064
9+	39,396	40,000	48,258	50,000	55,956	55,956

[1]From Table 3.E.1. *Social Security Bulletin. Annual Statistical Supplement, 1992.* Washington, DC: Social Security Administration, p.137.

TABLE A-2

SELECTED DEMOGRAPHIC, GEOGRAPHIC, AND FAMILY CHARACTERISTICS OF CHILDREN BY HEALTH INSURANCE AND INCOME GROUP, 1982, 1988 AND 1991 NHIS

	1982		1988		1991	
	Study Sample	Children Missing Data	Study Sample	Children Missing Data	Study Sample	Children Missing Data
Percent	92.4	7.6	88.5	11.5	88.2	11.8
Age[1,2,3]						
≤ 12 months	6.3	5.8	6.5	6.3	7.0	5.4
1 - 2 years	11.2	8.9	11.6	8.9	11.7	10.1
3 - 6 years	21.1	17.1	23.1	21.4	23.6	19.3
7 - 12 years	32.6	31.0	32.4	31.0	32.6	36.5
13 - 17 years	28.9	37.3	26.5	32.5	25.1	28.8
Gender						
Male	51.1	51.9	51.1	51.4	51.3	50.7
Female	48.9	48.1	48.9	48.6	48.7	49.3
Race/Ethnicity						
White	71.8	68.8	68.6	66.0	66.6	64.3
African-American	14.3	16.7	14.9	14.8	14.7	18.1
Hispanic	11.0	12.1	13.1	15.9	15.3	13.3
Other	2.8	2.5	3.4	3.4	3.5	4.3
Region[3]						
Northeast	20.8	22.0	18.1	19.6	19.5	15.0
Midwest	26.5	23.9	26.5	23.1	24.0	21.5
South	33.2	36.8	34.2	40.1	32.8	45.8
West	19.6	17.4	21.3	17.1	23.7	17.7
Metropolitan Residence[2]						
Metropolitan-central city	26.7	24.3	30.2	27.0	31.1	26.5
Metropolitan-not central city	40.9	40.3	45.5	51.1	48.1	45.3
Non-metropolitan	32.4	35.4	24.3	21.9	20.7	28.2
Family Structure[1,2,3]						
Both parents in HH	77.6	80.1	76.2	76.4	74.9	76.0
Single parent only	15.6	9.8	17.1	11.9	17.4	13.3
Single parent with other adult	3.5	6.3	4.8	7.6	5.3	7.0
Other	2.0	1.7	1.9	3.1	2.0	2.7
Unknown	1.4	2.1	0.1	0.9	0.4	1.0

[1] The p-value for the chi-squared test for equality in the distributions among the two 1982 child populations is < 0.001.
[2] The p-value for the chi-squared test for equality in the distributions among the two 1988 child populations is < 0.001.
[3] The p-value for the chi-squared test for equality in the distributions among the two 1991 child populations is ≤ 0.003.

TABLE A-3

SELECTED DEMOGRAPHIC, GEOGRAPHIC, AND FAMILY CHARACTERISTICS OF CHILDREN BY HEALTH INSURANCE AND INCOME GROUP, 1982 RANDOM SAMPLE

	1982				
	Medicaid Alone	Medicaid and Other Insurance	Low-Income Uninsured	Low-Income and Other Insurance	Moderate to High Income
Sample Size					
Unweighted	1,291	151	1,512	3,464	7,751
Weighted (1000s)	6,017	734	6,984	16,252	27,564
Percent	10.5	1.3	12.1	28.2	47.9
Age*					
≤ 12 months	9.8	9.6	9.3	7.5	6.5
1 - 2 years	14.3	15.0	12.8	11.1	11.0
3 - 6 years	22.8	23.2	22.1	24.1	19.8
7 - 12 years	33.0	31.4	35.3	37.1	36.3
13 - 17 years	20.1	20.8	20.5	20.3	26.5
Gender					
Male	51.3	50.6	49.9	51.9	50.5
Female	48.7	49.4	50.1	48.2	49.5
Race/Ethnicity*					
White	35.0	44.2	54.1	69.7	83.8
African-American	41.9	47.8	21.3	17.0	7.0
Hispanic	18.0	5.6	21.1	11.1	6.7
Other	5.2	2.5	3.4	2.2	2.5
Region*					
Northeast	28.6	19.4	13.5	20.5	21.5
Midwest	25.9	31.1	18.0	26.7	28.0
South	26.7	26.8	44.5	36.1	30.9
West	18.9	22.8	24.0	16.7	19.6
Metropolitan Residence*					
Metropolitan-central city	51.6	41.7	30.4	26.0	20.8
Metropolitan-not central city	23.2	32.7	28.8	35.2	51.3
Non metropolitan	25.2	25.6	40.9	38.8	27.9

TABLE A-3

SELECTED DEMOGRAPHIC, GEOGRAPHIC, AND FAMILY CHARACTERISTICS OF CHILDREN BY HEALTH INSURANCE AND INCOME GROUP, 1982 RANDOM SAMPLE (Continued)

	1982				
	Medicaid Alone	Medicaid and Other Insurance	Low-Income Unisured	Low-Income and Other Insurance	Moderate to High Income
Family Structure*					
Both parents in HH	27.7	27.5	67.0	77.9	89.3
Single parent only	51.0	45.4	19.1	15.4	7.8
Single parent with other adult	10.2	9.5	7.0	3.3	1.4
Other	7.2	12.3	4.2	2.2	0.8
Unknown	3.9	5.3	2.7	1.2	0.6
Mother's Education*					
Not a H.S. graduate	50.5	30.0	45.6	24.7	9.3
H.S. graduate	27.2	36.1	35.4	51.2	45.7
Some college	9.1	12.2	9.7	19.7	41.4
Unknown, no HIS mother>17	13.2	21.8	9.3	4.5	3.7
Mother's Employment Status*					
Currently employed	13.3	32.4	34.9	52.3	58.5
Unemployed	73.8	45.8	56.2	43.3	38.0
Unknown, no HIS mother>17	12.9	21.8	8.9	4.3	3.5
Mother's Marital Status*					
Married	31.2	27.5	69.3	78.3	89.7
Not married	55.8	50.7	21.8	17.2	6.6
Unknown, No HIS mother>17	13.0	21.8	9.0	4.5	3.7

[1]These figures represent the percentages of children with known health insurance and income information.

*The p-value for the chi-squared test for equality in the distributions among the different child populations is <.001.

TABLE A-4

COMPARISON OF CHARACTERISTICS OF ACTUAL AND MATCHED MOTHERS, 1988 NHIS

	Actual Mothers	Matched Mothers
Children living with mothers	95.2	94.6
Mother's Education		
Not a H.S. graduate	18.2	17.3
H.S. graduate	42.3	43.4
Some college	36.9	36.0
Unknown, not HIS mother >17	2.6	3.3
Mother's Employment Status		
Currently employed	60.9	59.7
Unemployed	4.1	3.7
Not in labor force	32.7	31.2
No HIS mother >17	2.3	5.4
Mother's Marital Status		
Married	75.7	75.2
Widowed	1.7	1.8
Divorced	9.1	8.6
Separated	4.1	3.7
Never married	7.1	5.3
No HIS mother >17	2.0	5.5
Mother's Age		
<18	0.5	—
18-24 years	10.7	8.4
25-29 years	18.6	17.1
30-34 years	22.8	23.0
35-39 years	21.7	22.3
40-44 years	14.1	15.5
45+ years	11.6	13.7

TABLE A-5

PERCENTAGE OF CHILDREN UNDER SIX YEARS OF AGE UP-TO-DATE IN IMMUNIZATIONS[1] FOR CHILDHOOD DISEASES BY HEALTH INSURANCE AND INCOME GROUP AND AGE, 1992 NHIS

	Medicaid Alone	Medicaid and Other Insurance	Low-income Uninsured	Low-Income and Other Insurance	Moderate to High Income	All Children[2]
All Children Aged under Six Years						
Diphtheria-tetanus-pertussis (DTP) - 4 doses at 2, 4, 6 and 18 months	55.6%	63.7%	56.8%	59.7%	66.1%	60.6%
Oral polio vaccine (OPV) - 3 doses at 2, 4 and 18 months	64.7	69.2	64.7	67.8	73.6	68.6
Measles, mumps and rubella (MMR) - 1 dose at 15 months	80.7	82.9	77.2	80.7	84.3	80.6
Haemophilus influenza type b (Hib) - 1 dose at 18 months	70.4	73.0	66.2	67.2	74.9	70.7
Haemophilus influenza type b - 3 doses at 2, 4 and 15 months	25.8	29.8	24.3	26.2	32.5	29.3
Hepatitis B virus (HBV) - 3 doses at birth, 2 and 18 months	7.5	4.2	6.9	7.2	9.1	8.8
All childhood immunizations, except Hib and HBV - 4 DTP, 3 OPV, and 1 MMR	51.9	57.8	50.8	54.4	60.6	55.7
All childhood immunizations, except HBV - 4 DTP, 3 OPV, 1 MMR and 1 Hib	43.8	50.0	41.5	43.3	52.0	46.8

TABLE A-5
PERCENTAGE OF CHILDREN UNDER SIX YEARS OF AGE UP-TO-DATE IN IMMUNIZATIONS[1] FOR CHILDHOOD DISEASES BY HEALTH INSURANCE AND INCOME GROUP AND AGE, 1992 NHIS
(continued)

	Medicaid Alone	Medicaid and Other Insurance	Low-income Uninsured	Low-Income and Other Insurance	Moderate to High Income	All Children[2]
Children Aged under Three Years						
Diphtheria-tetanus-pertussis (DTP) - 4 doses at 2, 4, 6 and 18 months	51.3%	***	50.8%	52.2%	62.3%	55.6%
Oral polio vaccine (OPV) - 3 doses at 2, 4 and 18 months	61.1	***	60.9	61.1	71.0	65.0
Measles, mumps and rubella (MMR) - 1 dose at 15 months	80.6	***	79.7	80.6	84.7	81.9
Haemophilus influenza type b (Hib) - 1 dose at 18 months	79.4	***	78.7	76.8	83.5	80.2
Haemophilus influenza type b - 3 doses at 2, 4 and 15 months	30.7	***	29.2	33.7	40.6	35.2
Hepatitis B virus (HBV) - 3 doses at birth, 2 and 18 months	5.9	***	4.3	4.5	7.7	6.9
All childhood immunizations, except Hib and HBV - 4 DTP, 3 OPV, and 1 MMR	47.1	***	44.7	45.5	55.0	49.7
All childhood immunizations, except HBV - 4 DTP, 3 OPV, 1 MMR and 1 Hib	42.5	***	40.4	41.9	51.5	45.8

TABLE A-5
PERCENTAGE OF CHILDREN UNDER SIX YEARS OF AGE UP-TO-DATE IN IMMUNIZATIONS[1] FOR CHILDHOOD DISEASES BY HEALTH INSURANCE AND INCOME GROUP AND AGE, 1992 NHIS
(continued)

	Medicaid Alone	Medicaid and Other Insurance	Low-income Uninsured	Low-Income and Other Insurance	Moderate to High Income	All Children[2]
Children Aged Three to Five Years						
Diphtheria-tetanus-pertussis (DTP) - 4 doses at 2, 4, 6 and 18 months	62.9%	***	62.9%	66.2%	70.2%	66.1%
Oral polio vaccine (OPV) - 3 doses at 2, 4 and 18 months	69.7	***	68.5	73.6	76.3	72.5
Measles, mumps and rubella (MMR) - 1 dose at 15 months	75.5	***	74.6	80.7	73.6	79.1
Haemophilus influenza type b (Hib) - 1 dose at 18 months	56.7	***	53.7	59.0	65.7	60.2
Haemophilus influenza type b - 3 doses at 2, 4 and 15 months	18.5	***	19.4	19.8	23.9	22.8
Hepatitis B virus (HBV) - 3 doses at birth, 2 and 18 months	9.9	***	9.5	9.6	10.6	10.9
All childhood immunizations, except Hib and HBV - 4 DTP, 3 OPV, and 1 MMR	59.2	***	57.0	62.0	66.5	62.2
All childhood immunizations, except HBV - 4 DTP, 3 OPV, 1 MMR and 1 Hib	45.7	***	42.5	44.5	52.6	47.8

NOTE: Chi-squared tests of differences in the percentages of children immunized across the health insurance and income groups were significant with p-values $\leq$ 0.003 for all immunizations, except the hepatitis B vaccination which had a p-value = 0.03 for children aged 3-5 years.

*** Sample size too small for reliable estimates.

[1] Children are counted as immunized if they had all the recommended immuniaztions for their age group, regardless of whether or not they received them at the recommended age intervals.

[2] The All Children column includes data for the 10 percent of sample children under six years with unknown income and/or health insurance information.

TABLE A-6

LOGISTIC REGRESSIONS OF THE PROBABILITY OF ANY PHYSICIAN CONTACTS, 1982, 1988 and 1991 NHIS

	1982		1988		1991	
	Beta	s.e.	Beta	s.e.	Beta	s.e.
Intercept	1.70**	0.60	1.49**	0.47	0.40	0.53
Gender and Age Group (female, 13-17 years left out)						
Male, ≤ 12 months	1.70***	0.24	2.15***	0.33	2.77***	0.27
Male, 1-2 years	1.98***	0.22	2.25***	0.26	1.90***	0.20
Male, 3-6 years	0.83***	0.13	1.00***	0.14	1.02***	0.14
Male, 7-12 years	0.01	0.11	0.10	0.11	-0.04	0.11
Male, 13-17 years	-0.11	0.13	0.19	0.12	-0.15	0.10
Female, ≤ 12 months	1.63***	0.25	2.23***	0.30	1.96***	0.30
Female, 1-2 years	2.09***	0.22	1.93***	0.21	2.64***	0.30
Female, 3-6 years	0.90***	0.15	0.89***	0.14	0.73***	0.13
Female, 7-12 years	0.09	0.11	0.13	0.12	-0.05	0.11
Race (other left out)						
White	0.02	0.29	0.16	0.17	0.39*	0.16
African-American	-0.13	0.29	-0.15	0.18	0.08	0.17
Hispanic	0.14	0.29	0.12	0.17	0.24	0.17
Financial barriers (moderate to high income left out)						
Medicaid only	-0.07	0.78	-0.10	0.55	0.99	0.61
Medicaid and other insurance	0.38	0.89	0.14	0.61	1.75*	0.70
Low-income uninsured	-1.57*	0.73	0.18	0.50	-0.39	0.55
Low-income insured	0.28	0.48	0.16	0.43	0.25	0.39
Medicaid program characteristics						
AFDC payment standard	-0.10	0.48	-0.05	0.29	0.59	0.55
AFDC payment standrad Medicaid coverage	0.65	0.80	0.02	0.49	-1.46	1.02
AFDC payment standard X Low-income uninsured	1.04	0.82	-0.46	0.53	-0.40	0.84
AFDC payment standard X Low-income private insurance	-0.34	0.57	0.45	0.48	-0.63	0.64
Medicaid fee index	-0.21	0.22	0.22	0.20	0.45**	0.17
Medicaid fee index X Medicaid coverage	-0.03	0.45	-0.08	0.45	-0.68	0.43
Medicaid fee index X Low-income uninsured	0.34	0.44	-0.74	0.41	-0.36	0.34
Medicaid fee index X Low-income private insurance	-0.43	0.28	-0.88**	0.30	-0.43	0.26
Index of children per child health provider	-0.08	0.11	-0.12	0.09	-0.13	0.09
Emergency room per square mile	0.02***	0.00	-0.01	0.01	-0.00	0.01

TABLE A-6

LOGISTIC REGRESSIONS OF THE PROBABILITY OF ANY PHYSICIAN CONTACTS, 1982, 1988, and 1991 NHIS
(Continued)

	1982		1988		1991	
	Beta	s.e.	Beta	s.e.	Beta	s.e.
Perceived health status (fair to poor left out)						
Excellent	-0.68*	0.27	-0.85**	0.29	-0.40	0.32
Very good	-0.59*	0.26	-0.57	0.31	-0.19	0.30
Good	-0.34	0.28	-0.59	0.30	-0.06	0.30
Limited in activity (not limited left out)	0.55**	0.20	0.75***	0.16	0.72***	0.20
Number of bed disability days	0.22***	0.02	0.21***	0.02	0.17**	0.06
Single parent household	-0.08	0.10	-0.05	0.09	0.17	0.10
Number of siblings under 18 years	-0.11**	0.04	-0.13***	0.03	-0.04	0.04
Mother's education (some college left out)						
Not a high school graduate	-0.65***	0.11	-0.54***	0.11	-0.43***	0.12
High school graduate	-0.23**	0.08	-0.32***	0.07	-0.28***	0.08
Mother is employed (unemployed left out)	-0.07	0.07	-0.05	0.06	-0.10	0.07
Region (west left out)						
Northeast	0.34**	0.10	0.52***	0.11	0.69***	0.13
Midwest	0.25*	0.12	0.35***	0.10	0.29*	0.11
South	0.16	0.16	0.05	0.13	0.08	0.12
Urban/rural (rural left out)						
Large urban, inner city	0.03	0.11	0.28*	0.11	0.44***	0.12
Large urban, suburban	0.03	0.10	0.22	0.10	0.23*	0.11
Medium sized urban	0.10	0.11	0.13	0.11	0.27**	0.10
Small urban	0.04	0.16	-0.15	0.12	0.09	0.12
Sample size	9,528		12,015		12,205	
Approximate chi-square	5,089.86***		6,776.59***		7,241.57***	
Satterwaite adjusted F, overall model	35.28***		46.24***		43.88***	

* p-value ≤ 0.05
** p-value ≤ 0.01
*** p-value ≤ 0.001

TABLE A-7

OLS REGRESSIONS OF THE NUMBER OF PHYSICIAN CONTACTS, 1982, 1988 and 1991 NHIS

	1982		1988		1991	
	Beta	s.e.	Beta	s.e.	Beta	s.e.
Intercept	7.81***	1.40	7.86***	1.01	7.38***	0.93
Gender and Age Group (female, 13-17 years left out)						
Male, ≤ 12 months	1.92***	0.24	2.46***	0.34	1.71***	0.26
Male, 1-2 years	1.84***	0.29	2.50***	0.27	2.22***	0.23
Male, 3-6 years	0.38	0.22	0.94***	0.26	0.74**	0.25
Male, 7-12 years	0.49	0.36	0.29	0.21	0.30	0.22
Male, 13-17 years	-0.08	0.26	0.38	0.27	-0.23	0.27
Female, ≤ 12 months	2.22***	0.28	2.57***	0.30	1.95***	0.27
Female, 1-2 years	1.83***	0.27	2.77***	0.40	2.38***	0.30
Female, 3-6 years	0.53*	0.24	1.05***	0.25	0.48*	0.22
Female, 7-12 years	-0.31	0.24	-0.06	0.20	-0.18	0.23
Race (other left out)						
White	-0.08	0.59	0.52	0.31	0.34	0.27
African-American	-0.98	0.65	-0.29	0.33	-0.57	0.31
Hispanic	-0.29	0.55	0.04	0.32	-0.06	0.29
Financial barriers (moderate to high income left out)						
Medicaid only	-0.56	1.15	0.29	0.90	-0.57	0.93
Medicaid and other insurance	-0.34	1.24	-0.22	0.99	0.27	1.35
Low-income uninsured	-3.27***	0.89	-2.89**	1.02	-1.56	1.10
Low-income insured	0.33	1.14	-1.05	0.58	-0.30	0.79
Medicaid program characteristics						
AFDC payment standard	0.42	0.81	-0.74	0.53	-0.50	0.56
AFDC payment standard X Medicaid coverage	2.15	1.20	0.56	0.87	1.07	1.36
AFDC payment standard X Low-income uninsured	2.28*	0.94	2.19	1.15	1.19	1.56
AFDC payment standard X Low-income private insurance	-0.57	1.35	0.95	0.59	0.37	1.15
Medicaid fee index	-0.10	0.44	-0.26	0.32	0.29	0.25
Medicaid fee index X Medicaid coverage	-1.04	0.79	-1.13	0.69	0.78	0.72
Medicaid fee index X Low-income uninsured	1.27*	0.61	0.98	0.77	0.48	0.82
Medicaid fee index X Low-income private insurance	-0.66	0.62	0.20	0.45	0.11	0.72
Index of children per child health provider	-0.29	0.21	-0.28	0.20	-0.35***	0.11
Emergency room per square mile	0.01	0.01	0.01	0.01	0.01	0.01

TABLE A-7

OLS REGRESSIONS OF THE NUMBER OF PHYSICIAN CONTACTS, 1982, 1988, and 1991 NHIS
(Continued)

	1982		1988		1991	
	Beta	s.e.	Beta	s.e.	Beta	s.e.
Perceived health status (fair to poor left out)						
Excellent	-5.16***	0.97	-4.75***	0..93	-4.95***	0.84
Very good	-4.27***	0.97	-4.08***	0.92	-4.26***	0.84
Good	-3.58***	0.95	-3.40***	0.94	-3.27***	0.84
Limited in activity (not limited left out)	2.69***	0.62	3.71***	0.47	2.29***	0.49
Number of bed disability days	0.13**	0.05	0.21***	0.03	0.24***	0.04
Hospitalized during the year (not hospitalized left out)	1.62**	0.57	1.80**	0.55	1.40	0.84
Number of siblings under 18 years	-0.13	0.08	-0.22***	0.06	-0.22**	0.07
Single parent household	0.09	0.21	-0.05	0.18	-0.11	0.21
Mother's education (some college left out)						
Not a high school graduate	-0.80***	0.21	-0.58**	0.19	-0.65**	0.23
High school graduate	-0.24	0.14	-0.56***	0.12	-0.41**	0.14
Mother is employed (unemployed left out)	0.08	0.14	-0.21	0.13	-0.09	0.11
Region (west left out)						
Northeast	0.13	0.24	-0.30	0.20	0.15	0.17
Midwest	0.01	0.26	-0.04	0.21	-0.05	0.18
South	0.34	0.39	-0.30	0.27	-0.27	0.19
Urban/rural (rural left out)						
Large urban, inner city	-0.09	0.25	-0.25	0.20	0.06	0.17
Large urban, suburban	0.04	0.26	0.43	0.24	0.32	0.21
Medium sized urban	0.09	0.25	-0.16	0.15	0.00	0.15
Small urban	0.00	0.29	-0.14	0.28	-0.18	0.20
Sample size	7,708		9,943		10,177	
R^2	0.168		0.206		0.214	
Satterwaite adjusted F, overall model	131.02***		152.48***		160.32***	

* p-value ≤ 0.05
** p-value ≤ 0.01
*** p-value ≤ 0.001